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JOURNAL
OF THE
American Veterinary Medical Association

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(Original Official Organ U. S. Vet. Med. Ass'n.)

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RECRUITS WANTED

IT WOULD appear that the time has arrived when something should be done toward securing a larger attendance at our veterinary colleges, especially in Canada. To those of us who believe that the veterinary profession is destined to fill a much larger sphere and be of greater service to mankind in future than in the past, the small numbers taking the veterinary course in our institutions of learning is a matter of considerable concern.

It is true that at the present time to many within the ranks, the future of the profession is not alluring, and they would hesitate to recommend it to anyone as a vocation. The present conditions by which many are judging the future are, however, only temporary and will adjust themselves. To a certain extent the veterinary profession is on trial today and it rests with its members whether they will rise to the occasion and fill the place which is opening out to them.

The profession is inseparably linked with agriculture. The former could not exist nor the latter prosper without the other, and the profession should strive to render to agriculture the greatest possible service.

In our veterinary schools the horse has occupied too large a

place in the curriculum. In future the other domesticated animals should occupy a more prominent place. Graduates will then be prepared to render a greater measure of service in their communities.

Joined as we are to agriculture, which will last as long as the human race, if we are prepared to fill our proper place we need entertain no fears regarding the future, and may with full confidence recommend the veterinary profession to such suitable persons as are seeking a calling.

To encourage more students the matter of giving scholarships should be seriously considered by veterinary associations, and could well be brought to the attention of the various livestock breeders' associations as well as wealthy corporations and individuals interested directly or indirectly in agriculture. State aid to veterinary colleges is now an established practice. Assistance to certain selected students might profitably be considered by our legislators. M. B.

RINDERPEST SERUM

The U. S. Bureau of Animal Industry has received from the Bureau of Agriculture, Philippine Islands, a fresh supply of anti-rinderpest serum.

The United States has never been invaded by this disease and every reasonable precaution is being taken through the Federal quarantine service to prevent such an occurrence. However, in view of the appearance of the disease since the war in countries of Western Europe and South America with which we carry on extensive commercial intercourse, a supply of this serum is being kept on hand in order that no time would be lost in utilizing all of the effectual methods known in combating an outbreak should one occur. Rinderpest serum is much like hog cholera serum in that it produces a very firm and lasting immunity when used with the virus.

It is to be regretted that there is not available an equally effective and dependable serum for use against foot-and-mouth dis ease. Unfortunately none of the various methods proposed for immunizing cattle against foot-and-mouth disease produces more than a very temporary immunity and even that slight degree of protection can not always be depended upon.

VETERINARY SCIENCE CONQUERS RINDERPEST

THE SUCCESS in eradicating the recent outbreak of rinderpest in Belgium was a triumph of veterinary sanitary science and has served to show that this dreaded scourge loses much of its terror when combated by a good veterinary organization following scientific methods. For the future the ravages of the plague are to be feared chiefly in savage or semicivilized regions where no veterinary organization exists and where no rational sanitary measures are taken.

The Belgian outbreak was the first visitation in Western Europe for about half a century, or since the Franco-Prussian war. Although rinderpest is preeminently a war pestilence and often follows in the wake of armies where there have been large movements of food animals, war conditions can not be assigned as the cause in the recent instance. The introduction of the infection was traced to a cargo of zebu cattle from British India, en route to Rio de Janeiro, which touched at Antwerp about the end of June, 1920. The animals were unloaded and held several days in the quarantine station at Antwerp before being reloaded in another boat. Many of them died in quarantine, but rinderpest was not suspected. Other cattle imported for food purposes passed through the quarantine station about the same time, being held there but one or two days and then shipped to various interior points for slaughter. Most of them were slaughtered before the disease had developed, but the malady appeared in a few small lots, the slaughter of which was delayed. So far the disease was confined to a few abattoirs and its identity was not recognized. Then a consignment of German cattle for reparation was unloaded at one of these infected abbattoirs (Ghent) for distribution to the country districts; the disease was spread through their agency, and about July 20 it was recognized as rinderpest. The diagnosis was confirmed by inoculation tests.

The Belgian veterinary sanitary service attacked the problem energetically. The French authorities naturally became alarmed also, and closed the French frontiers to Belgian cattle and prohibited the movement of animals within the French communes adjacent to Belgium. The French veterinary service in the devastated frontier districts had to be reorganized. The French authorities also offered cooperation to the Belgians and proposed

the establishment of a serum station at Brussels, all of which was readily accepted. Within two months the French mission had not only succeeded in producing a sufficiency of serum but had accumulated valuable experimental data. The fine team-work of the Belgian and French veterinary services made possible the success in restricting and stamping out the infection.

Some interesting observations and conclusions are set forth by the *Revue Generale de Medecine Veterinaire,* which is the source of much of the foregoing information. The *Revue* says:

"The observations recorded show that the creation of new centers of infection was caused, in nearly every case, by the fraudulent or accidental movement of contaminated animals; in some simply by moving uncooked fresh meat. On the other hand, none of the indirect methods of contagion, as mentioned in all the classics, was observed. Living intermediaries, such as man, nonsusceptible animals, etc., play a small part or none at all. Careful observations show that flies can not transmit the disease. * * *

"It thus seems that cattle plague is not so serious as it is generally assumed to be. Previously observed outbreaks, with rare exceptions, have occurred either consequent on military campaigns or in countries where sanitary measures encounter great difficulties of various kinds. * * * On the other hand, it is easily combated in countries which possess an adequate sanitary organization. * * *

"The facts gathered in 1920 are reassuring. They show the value of the classical methods in a country having a veterinary organization. It is certain that the fear inspired by the redoubtable 'plague' of cattle is a great help; and, thanks to this fear, severe measures can be enacted without fear of protest and applied without fear of resistance. The fear of contagions is such that in the case of this disease one obtains that collaboration on the part of those interested which is essential for all successful intervention."

Another outbreak of rinderpest was likewise dealt with successfully under very difficult conditions by the veterinary service of the Union of South Africa. It seems that the disease was enzootic in German East Africa, and in 1917 military operations and consequent movements of cattle caused the spread of the infection southward. The Union Government became alarmed and sent a veterinary commission to operate in the zone of danger. *The Veterinary Record* gives the history as follows:

"A belt was formed right across the gap between the northern end of Lake Nyassa and the southern end of Lake Tanganyika.

Cattle were removed from a strip of country ten to twenty miles wide in this belt south of the German boundary, and north of this strip the cattle were all immunized by a so-called 'simultaneous' method along a strip 35 miles wide. North of the belt protection was afforded by the high range of mountains. The Commission fought against the disease for over a year, during which about a hundred thousand cattle were immunized successfully, and its work appeared to be terminated in July, 1918. But the disease was brought through the belt again by the retreat of the troops under the German commander at about the time of the armistice. The cattle, however, that had been immunized withstood completely the attack, the disease was quickly exterminated, so that in March, 1919, the labors of the Commission were definitely terminated."

The veterinary profession of the world may well feel a just pride in these two recent achievements in conquering an animal plague which for centuries has wrought devastation and fear. The value of a good veterinary sanitary organization is thus doubly demonstrated.

DR. A. M. FARRINGTON RETIRES

To date 48 employees of the Bureau of Animal Industry have availed themselves of the opportunity to retire from active service under the provisions of the Act of Congress of May 22, 1920. Dr. Farrington is one of them. He entered the public service from the State of Maine on September 8, 1881, when he was appointed Veterinary Inspector for the United States Treasury Cattle Commission. In 1883 he was appointed Veterinary Inspector for the Port of New York and superintendent of the Quarantine Station at Garfield, New Jersey. Later he was made Chief of the Division of Field Investigations and Miscellaneous Work, and finally, in 1906, he was advanced to the position of Assistant Chief of the Bureau. Having entered the public service before the establishment of the Bureau in 1884, he has seen it grow from its beginning to an organization with a personnel numbering approximately 5,000. He was one of the body of Bureau and State veterinarians which, under unfavorable and often vexatious conditions, succeeded in eradicating contagious pleuro-pneumonia from this country in 1892; he participated actively in the eradication of the outbreaks of foot-and-mouth disease in 1902, 1908, and 1914-15; he helped to organize and perfect our import animal quarantine service, which has proved

an effective barrier against the invasion of foreign plagues, as none has reached us through our quarantine stations; he figured prominently in making our meat inspection service the most efficient in the world; his ability as an organizer was of great assistance in formulating Bureau policies affecting the inauguration and perpetuation of cooperative activities with the States in combating such diseases as sheep and cattle scabies, dourine, and the eradication of the Southern cattle tick, and his tact and good judgment were helpful in maintaining cooperative accord.

It is appreciated that throughout Dr. Farrington's thirty-seven years of faithful and efficient service his example, wise counsel and keen forsight contributed much to the success and achievements that have elevated the Bureau to the position of confidence and respect it now enjoys. In a wide sphere of usefulness he bore with modesty the honors and responsibilities of his important official assignments, and always performed his duties cheerfully and creditably. He may well be proud of his service record, and he carries with him in retiring the respect and esteem of his many friends among the readers of THE JOURNAL who join the editor in best wishes and the hope that he may enjoy the leisure to which he is so justly entitled.

BRITISH VETERINARY ASSOCIATION ACQUIRES A JOURNAL

THE NATIONAL Veterinary Medical Association of Great Britain and Ireland has acquired *The Veterinary Record*, which, on January 1, became the official organ of that Association. The British profession is to be congratulated on this forward step, the wisdom of which we believe has been well shown in the instance of our own Association and its JOURNAL. In fact, it is stated that our successful experience had some weight with our British colleagues.

The initial number in the new series of the *Record* bears a touch of sadness in the form of an introductory editorial by the late Dr. John Malcolm, who, it seems, was to have been the editor under the new control but who passed away before the change was consummated. The present editors are Capt. J. T. Edwards and Dr. J. B. Buxton, the latter the General Secretary of the Association.

A foreward by the President of the National Association, Dr. O. Charnock Bradley, contains so much from which the pro-

fession in America may draw a lesson that we quote a few passages:

"Beyond question, one of the functions of an Association such as ours is the propagation and diffusion of professional knowledge; but an even more important purpose is the fostering of unity. No profession, however large, can be really powerful without unity; and in a small profession unity is one of the essentials of existence. * * * That the reorganization of the 'National,' and the possession by its members of an official organ, will serve as a close bond of union is the fervent hope of those who have been actively concerned in recent developments.

"But the success of an official professional journal postulates the support of the profession it purports to represent. * * * If the Association and its journal are to fulfill expectations, it must be possible to assert that those members of the profession who are not members of the Association are numerically and professionally negligible. Unless this can be done, however ably the journal may be conducted editorially, its full power can not be exerted or its full value realized. Fortunately, at the present moment, every indication points in a hopeful direction; but every member should feel it incumbent upon him to help turn probability into certainty by pressing the aims and claims of the Association on those who still stand outside. Unity is imperative. Unity of policy: unity of action: unity of support. * * *

"Regret has often been expressed that so much valuable material is lost through the practitioner's disinclination to commit his experiences to paper. Now that the practitioner is the part-owner of a journal, he may be induced to overcome his disinclination, and thereby increase the utility and value of his own property."

Dr. Malcolm in his introductory note said:

"The veterinary profession, like other large bodies, undoubtedly has its sectional differences; for example, the respective merits of whole-time and part-time inspectors. Such minor differences of opinion are capable of adjustment, and should not weaken united action and efforts for our common good. We are too small a body to present a divided front to the world outside the profession. * * * Trivial rivalries and jealousies must be forgotten and a tolerant and liberal spirit adopted, for unless we can convince the public of our complete unity there can be no genuine success."

We wish the British Association and *The Veterinary Record* much success in their new relationship, and trust that the paper under the new regime will be an even stronger factor in professional advancement.

UNDEVELOPED RESOURCES IN VETERINARY SANITATION AND HYGIENE

By A. F. SCHALK

School of Veterinary Medicine, North Dakota Agricultural College

AS we approach the end of the first quarter of the twentieth century there appears to be dawning upon the horizon a new day in veterinary medicine. From the earliest times down through the succeeding ages the noble horse and his equine brethren have served preeminently as the standard bearers of the most efficient and economic motive power to serve the purposes and well-being of the human race. During this long expanse of time veterinary medicine was largely crystallized around the horse, and the major portions of the problems involved in veterinary sanitation and hygiene were to be found in the realm of equine practice for that period. These conditions prevailed until comparatively recent times. However, with the advent of the twentieth century, and more particularly during the last decade, a new order of things, carrying with it a problem of no small moment, has been brought face to face with the profession.

The invention and rapid development of the various mechanical motor devices have at least temporarily displaced a large amount of horse power which mankind has depended upon for centuries. This new order of things has been brought about so suddenly that equine practice has been practically paralyzed in certain districts.

Thus the veterinary practitioner who happens to be so unfortunately located will feel more or less pressure until this chasm is bridged over and new adjustments made. Whether the present prevailing craze for mechanical motive power will develop into a permanent condition, regardless of a "dollars and cents" consideration, remains to be seen.

However, it is thoroughly established and acknowledged by all that the horse will never again occupy his former high rank in the power production world, and thereby a certain amount of equine practice is lost to the veterinary profession.

What does this newly created condition mean to us as a pro-

fession? Does it signify a curtailment of just so much veterinary practice, and that the profession must "stand by," statuelike, and let this period of depression, created by this condition, become a permanent fixture and go by unchallenged? There is a wise old proverbial saying, quite often quoted, that "Necessity is the mother of invention." Is it not possible that the necessity of compensating for the loss in equine practice will bring the profession to a fuller realization of its shortcomings and gross negligence in the past? Will it not serve as a tremendous dynamic force to bring out the many latent possibilities in the practice of veterinary medicine, which hitherto have been lying in smoldering dormancy?

EDUCATIONAL STANDARDS AND REQUIREMENTS

The opportunities are before us. The all-important question is, Are we going to grasp them and improve them to their highest possible development? Veterinary medicine from its very inception upon the American continent has been confronted with many obstacles and factors which have made its advancement a continual up-hill game. I want to take this occasion to express my appreciation for and pay humble tribute to the many staunch and loyal standard-bearers of higher veterinary education. While their final goal has not as yet been reached, they have gained a most commanding position from which a magnificent victory and ultimate success is sure to be attained.

In all spheres of human effort the growing demand of the twentieth century is for more and higher education and higher educational standards. Failure of our profession to keep abreast of the spirit and progress of the other professions and sciences in regard to higher educational requirements means hopeless gravitation and humiliating retrogression on our part. The ever-increasing demands by the livestock public implies greater responsibilities and obligations on the part of the veterinarian than ever before. How are we going to meet these pressing demands? Undoubtedly the most efficient means by which we can successfully cope with these problems is to develop and maintain a higher plane of veterinary education. Reading the signs of the present, it appears as though the chronic "slackers" and "draft evaders" of higher veterinary education, who have deliberately, persistently and everlastingly combated the progressive movement for things better, are finding their ranks

depleted by desertion until there is only a handful left to make a final stand. Apparently they are now attempting to barricade their ill-founded cause and doctrines with a new brand of propaganda, as we are now and then hearing reverberations to the effect that within a few years there will be a real scarcity and dearth of veterinarians, and suggesting that empiricism will run rampant.

If such a collapse should come to veterinary medicine, would it not be capping the climax with the proper kind of evidence to convince us that there is something radically wrong in our system and practice of veterinary medicine? Would it not prove conclusively to us that our system of "horse doctoring" has resulted in utter failure?

I, for one, do not anticipate such an unfortunate state of affairs, nor is it necessary that such a calamity should befall the profession in order to awaken us from our slumbers. However, if we interpret correctly the handwriting on the wall, I think the most of us can plainly see enough potent symptoms and external manifestations to indicate that it is high time for the profession as a whole to take a real stand and arrive at a definite decision upon the question. How often have we heard these men defending low requirements and standards and advocating the "grading down" system in matters educational, lamenting about veterinarians being denied their just recognition, and that we are constantly being humiliated by being ignored in matters where we should be authority. There is a reason. The premises are clear; draw your own conclusions.

Much time and space could be given over to detailed discussion of this question, but by concentrating and crystallizing the extracted substances from all the factors which enter into the educational phase of veterinary medicine, it appears as though we are ready for the question: Are we going to continue in the same old way, or possibly recede and retrograde from our present standing, as is urged and advocated by some, or are we going to "grade up" until we establish and maintain a plane equivalent to our allied sciences and professions? If we submit to the former plan we are everlastingly condemned by public opinion and sentiment to the "lowly horse-doctor class," from which it will be very, very difficult to emerge. By adopting the latter policy, I firmly believe we are destined

within the next quarter century to assume and worthily maintain our just professional status alongside our sister professions.

With the proud achievement of first-class high-school training, or its equivalent, for matriculation in our recognized veterinary institutions, and the further requirement of four full collegiate years for graduation therefrom, our profession has, for the first time in its American history, taken a firm stand to place veterinary science upon a sound, substantial basis, giving it at least the privilege and opportunity of developing itself into a permanent and established science. It is the gaining of this great milestone and the realization of this all-important fundamental principle that constitutes the biggest factor and makes up the largest contribution to the new order of things and the new day in veterinary medicine, into which we are entering.

LIVESTOCK STATUS AND VETERINARY OPPORTUNITIES

Reliable Government statistics inform us that our agriculture maintains an animal husbandry valued at between eight and nine billions of dollars. The same statisticians tell us that there is sustained an annual loss of two hundred millions of dollars from preventable diseases among our livestock. Can anyone picture a more prospective and fruitful field for service for a profession?

While the valuation involved in the animal industry of our country during the past decade far exceeds that of any previous time, it is also a noteworthy fact that the flocks and herds of the present contain fewer scrubs and a greater number of high grades and purebreds than ever before. This condition surely argues well for the practicing veterinarian. As the quality of the breeder's livestock improves there is a proportionate increase in the amount of capital he has invested. Consequently he takes greater pride in his animals, guards their health more cautiously, and in general puts forth his noblest efforts endeavoring to maintain his herd or flock in the highest possible state of production in order to bring forth the best economic returns as well as to satisfy the ambitions which moved him to breed and grow better blood. With the stockman in such mental attitude toward his animals, he will naturally appeal to competent and capable veterinary service

when available, upon much less provocation than if his stock were of inferior grade.

Coexistive with the tremendous stimulus in recent years for more and better grades of livestock which contributes to the world's supply of dairy products, meats, wool and leather, there arises a corresponding increase in the responsibilities on the part of the veterinary profession to deal satisfactorily and successfully with the many problems which enter into the hygiene and sanitation of our country's animal industry. Our position can hardly be likened to that of Alexander the Great, "who wept because he had no more worlds to conquer." I may be in error, but the signs of the times indicate to me, in no uncertain terms, that it might be well for us to take thorough inventory of our stocks in hand and see if we can not possibly fortify and equip ourselves better in order to demonstrate to the livestock fraternity and the public in general that our profession is a worthy one and indispensable to economic and efficient animal husbandry.

Having checked over our wares in an impartial, unprejudiced and unselfish manner, I do not think it at all difficult to point out several items wherein weakness exists, and which ought to have our most serious thought and attention. Although the resources of veterinary sanitation and hygiene are numerous and manifold, is it not a fact that many of them have been only slightly and partially developed, while others have remained wholly neglected and undeveloped?

In discussing the resources of our profession and the many factors pertaining thereto, I do not hope to bring out anything entirely new and startling. In fact, I think all of the phases of which I propose to speak have been brought to your attention many times in one form or another, but in most instances they have been given but mere mention, or passed over lightly. Therefore I wish to enter into considerable detail in attempting to lay before you in a most vivid manner what I consider great possibilities in our resources which are ordinarily overlooked and ignored. If I should succeed in placing some of these apparent commonplace omissions before you in their true light and significance I shall have fulfilled the purpose of this paper.

When endeavoring to locate the causes and place the respon-

sibility for this state of affairs it seems as though practically all branches of veterinary medicine come in for a share of the blame, with perhaps the schools and practitioners carrying the major portion of the burden.

THE SCHOOLS' RESPONSIBILITY

Let us begin with the veterinary colleges, the mainspring of the profession and the true fountain source of veterinary knowledge. It is in the college career that the plastic mind is wrought and molded. It is here that the fundamental principles of veterinary science should be well grounded for the future. The great Osler, of immortal medical fame, once said that "the school could only guide and direct the student, but make sure that that guidance is in the right direction." This statement sums up the situation quite well, and thereby the school assumes a real responsibility when it opens its portals to matriculating students.

We have elaborated to some extent in our opening pages upon the question of entrance requirements and standards. We now take it for granted that there will be no turning backward by the opposing forces, but that instead these standards will be maintained and possibly raised from time to time by the progressive elements as the progression of the times require it. This phase of the subject requires no further discussion.

Inasmuch as veterinary medicine is passing through a transitional stage, we might inquire if the schools are making the necessary adjustments to meet the demands and requirements of the times. Veterinary schools function primarily through three fundamental avenues—its physical equipment, the teaching staff, and the curricula.

The Physical Equipment

A modern veterinary plant equipped in an up-to-date manner is one of the real essentials, and no institution has reasons for existence without such equipment. The student requires appropriate and adequate apparatus with which to work, and ample space in which to go about his work. Many institutions in the past were compelled to crowd 75 to 100 students into laboratories which could conveniently accommodate only one-fourth to one-half that number. The only possible result from such conditions is an utter failure for the student in his labora-

tory training. Thus he is compelled to enter upon his professional career under a tremendous handicap, which in a majority of cases must be carried through life. The closing of the doors of most of the private schools has largely removed these overcrowded and under-equipped conditions. The passing of these institutions shows rather conclusively that it is not profitable to attempt to train medical students by modern approved methods in schools entirely supported by private capital.

Another essential auxiliary in physical equipment is a carefully selected and well-appointed departmental library. Reliable current journals, authoritative texts and special monographs should not only be available and convenient but the student should be trained to use them intelligently. To allow a student to confine himself to the lectures and possibly one or two texts in most subjects means narrow and incomplete training. Lead him out into the world of literature through judiciously chosen references and you will not only develop a broad and comprehensive man, but will cultivate the habit of reading and searching for the best there is in the literature.

The Teaching Staff

The personnel of the instruction staff exerts a wonderful influence upon the student. In so far as possible teachers should be specialists in their respective lines and be capable of imparting instruction. A good teacher is a combination of thorough knowledge, tact, skill and diplomacy. This combination has the faculty of presenting subject matter in an interesting, instructive and effective manner so that it actually becomes a part of the student.

An ideal institutional policy is one which requires that all teachers give their undivided time and energy to their teaching and allied activities. Those engaged in teaching foundational subjects should be expected to give over their extra time to pursuing some investigational work along their lines of teaching and making special studies in how to make their work applicable and more readily correlated with the clinical subjects which follow in the course. Teachers who offer the purely clinical branches such as surgery and medicine should of necessity be broad and comprehensive men, with thorough knowledge of and sufficient experience in their respective subjects to speak with authority. Private practice on their part should be dis-

couraged and in fact forbidden. They can and should keep in touch with actual practice by a careful study of the resident hospital cases and above all by personal direction of the ambulatory clinics in the field.

The Curriculum and Collegiate Training

The recognized and accredited veterinary colleges of today are required to have a collegiate course of study covering four years of nine months each. While the course of study is not uniform in the different institutions, there is more or less similarity in the subject matter taught and in many instances the amount of time allotted for the various subjects. In consideration of the fact that veterinary practice is experiencing a changed state of affairs, it is highly important that we carefully consider our present-day curricula, with the idea of making readjustments, where necessary, to fit and prepare better the future veterinarian to meet the growing problems which are confronting him.

I think we are pretty well agreed that many of the courses in the veterinary curricula are fairly well established and require but little modification. They seem to be taken care of from time to time in the evolution of the science. However, on the other hand, I think you will further agree that some of the subjects require readjustment or possibly reorganization so that the demands of the time may be met with a wider and more efficient field of service by the veterinarian.

Anatomy and Physiology

From the earliest times in veterinary science the teaching of anatomy has been largely builded around the horse. This condition is quite a natural sequence, since this species has furnished the major portion of veterinary practice. Consequently our modern texts feature the horse and the greater part of their subject matter is given over to that animal. It is only by such concentration upon one species that the art of dissection has been brought to its present high state of development by the grand old masters of anatomy. We are now confronted with a difficult proposition, since the horse is being replaced in the field of practice by other classes of livestock. The time ordinarily set aside for dissection in the different schools is not sufficient to give equal time to each individual species. There-

fore something must be sacrificed, and great care should be exercised in placing the necessary emphasis upon the most important phases of the subject.

Some institutions have already taken steps to adapt themselves to the new conditions, and their anatomical departments have made real progress. However, the situation is far from being solved, and it is hoped that in the not distant future a satisfactory policy will have been worked out by which all schools can offer their students those essentials of the anatomy of all the domesticated animals, which will enable them to ply their profession with the greatest possible confidence.

What has been said about the subject of anatomy applies equally well to physiology. It is well known and particularly recognized by teachers that veterinary physiology has a very limited amount of material to offer to students which is based entirely upon experimental data gathered from conscientious research and investigation. As a science it is not fixed and established like anatomy and some other branches. Each decade or fraction thereof brings forth some new findings, but on the whole the complicated and deep-seated secrets of normal function are brought to light rather slowly, and many of these are incomplete and require further investigation by succeeding generations before they are confirmed and established as physiologic facts. It is to be regretted that the most of our text-books are dependent upon human physiology for their subject matter. This is only another acknowledgment and illustration that the wide field of fruitful resources furnished by the many classes of domesticated animals remain undeveloped and are calling for solution by our profession.

The Need of More Animal Husbandry Training

The impetus which has given general stimulus to production of more purebreds and higher grade herds and flocks has likewise resulted in a better educated livestock public. The breeders have also greatly increased their sanitary troubles by resorting to intensive breeding and forced feeding methods, endeavoring to produce top-notch individuals and turn out production records for their animals. These two conditions can do no other than reflect greater responsibilities upon the veterinary profession.

After making a most careful survey of the present status of animal husbandry subjects in the veterinary curricula of

today, and considering the stockmen's probable expectations of the veterinarian of the future, I do not hesitate in stating that I think it highly advisable to give the student a better foundation in the fundamental principles of types and breeds of livestock and breeding and production as well as feeds and feeding and nutritional problems in general. In the past many schools have woefully neglected this side of the student's training, and as a result many veterinarians have been inflicted upon the livestock world almost wholly ignorant of the very rudiments of animal husbandry. I fully realize that schools do not have enough time to make livestock specialists out of veterinary students, but they do owe their students the privileges and opportunities to obtain at least a sufficient amount of livestock knowledge to put them on their feet. To what extent they will develop themselves along this line in after life will depend upon the spirit, industry and capability with which they will apply themselves. As most veterinary schools of today are associated with state institutions where good herds and flocks are maintained in numbers and variety, there is little or no excuse for lack of conveniences and material. Let it be said that the schools gave them the proper start and direction.

Importance of a Real Course in Veterinary Hygiene

The supreme importance of hygiene and sanitation is brought home very forcibly to us in our sister profession of medicine. The most of us are familiar with the classical work accomplished through the agencies of National, State and municipal public-health surveys throughout our country. It is looked upon with sufficient importance that special graduate training is prescribed and required of physicians before they can qualify for positions requiring experts and specialists along hygienic lines. Evidently the time has not arrived in veterinary science for such rigid hygienic and sanitary requirements. However praiseworthy the policy may be, it would hardly be feasible at this time, all things being considered.

Nevertheless is it not possible and moreover advisable for us to give our students better training in hygiene and sanitation? In most European institutions this subject is given a major position in their curricula. How many veterinary schools of America, past and present, have even as much as offered a course in veterinary hygiene? Apparently but few school officials have

come to appreciate the real value of a good, organized and well-balanced course in this subject. When we come to summarize do we not find the greater percentage of animal diseases which the veterinarian is called upon to diagnose, treat and correct, originating from faulty hygienic conditions of air, water, soil, foods and a host of other sources which properly come under the head of hygiene? Truly it may be said that the most of these topics are touched upon elsewhere in the course, but often only lightly and usually in a fragmentary and disconnected manner. In a course in hygiene that has been carefully and systematically organized, and one that is truly worthy of the name, the "cause and effect" and the "means and end" of disease conditions are connected and correlated in a natural and impressive manner. With such brand of knowledge in stock the student enters the professional world well equipped to make a thorough and intelligent survey of conditions with the idea of arriving at a satisfactory diagnosis and probably rendering an intelligent and reliable opinion to his clientele.

Diseases of Breeding Animals

Before closing our discussion on the schools' duties and responsibilities, it is necessary to dwell upon one more phase of the question, which seems to be most pertinent and opportune. I refer to special training of students in the many complicated diseases involving reproduction in our breeding animals. It is primarily a hygienic problem, and could have been discussed very well under that heading. However, the comprehensiveness of this question, together with its great economic significance to the livestock interests, certainly warrants its being given a major rôle, and perhaps it should be made a separate and distinct course in our veterinary curricula. Sterility in cattle alone, with its allied conditions of abortion disease and retained placentæ and probably other complications, constitutes a vicious cycle of diseases in which the financial losses sustained are exceeded only by those of tuberculosis. The breeders of today, and especially those engaged in the production and development of high-grade and purebred animals, are calling loudly and persistently for assistance and relief along these lines. That an urgent need exists there is no doubt, and I am very glad to state that some schools have already taken

preliminary steps to train their students to meet the sterility problems.

Can sufficient knowledge be attained on this subject by the average student by simply requiring more time for and placing greater emphasis upon the anatomy, physiology, pathology, bacteriology and surgery of the reproductive organs? While much can be accomplished in this manner, and it would serve as an admirable foundation, it appears as though its importance justifies a separate, carefully constructed course in which the many theoretical considerations could be supplemented by a good laboratory course affording the student practical application and real practice. I believe that in the future the burden of censure will be placed at the doors of the schools which fail to furnish the proper training for their students in this invaluable field of work.

Post-Collegiate Resources

Having attempted to review some of the pre-collegiate and collegiate conditions which might be carried to a higher state of development, let us now turn our attention to the post-collegiate resources. I am not authority for these statistics, but have been told that approximately 85 per cent of all graduate veterinarians become practitioners, 10 per cent are engaged in State and Federal sanitary control work, and 5 per cent pursue other veterinary activities such as teaching, research, army service and commercial work. Evidently the big field in veterinary medicine lies in practice, and all will grant that the field is long, broad and deep, and interspersed with many undulations whose peaks are not always readily and easily accessible to the veterinary practitioner. Armed and equipped with the best that the schools of today can furnish him, he soon realizes he is stepping out into a world of unknowns. If the school has guided and directed in the right way it can do no more at the start. It now becomes a matter of personal endeavor and individual effort on the part of the graduate which largely determines ultimate success or failure.

THE VETERINARY PRACTITIONER

In the "halcyon days" of the past when horse practice was lucrative it was only necessary for the practitioner to locate in a large city or in some prosperous agricultural community where he could practice in independence and with fairly profitable

remuneration. He knew something about horses, often encountering little or no competition, and with the break in "luck" with his application of medicine and surgery he made a comfortable living. But since "Old Dobbin" has jogged down the road, never to return in his former rôle of splendor, it is needless to say that the old order of things is gone and a new setting is before the practitioner.

Is this situation sounding the death knell of veterinary practice, and does it signify a probable loss of livelihood for the practitioner?

The personal element of the man himself is quite certain to be the big factor in determining the outcome. It was never more important than at the present time that the veterinarian, in order to be successful, should keep abreast of modern progress. Surely, enough conditions exist which require special thought and immediate action, and above all there is the need of the practitioner's greater knowledge, closer harmony and deeper sympathy in all things pertaining to livestock. The stockmen of today are a more enlightened class than in the past, and naturally they expect a higher grade of veterinary service to assist them in adding to the comforts, health and productiveness of their animals. That he may measure up to the breeders' expectations it becomes necessary that the average veterinarian greatly increase his general knowledge of the animals he is called upon to treat. How often do we hear "Doc knows a lot about horses, but he don't know as much as I do about cattle, sheep, and hogs." Immediately there arises more or less doubt in the owner's mind as to whether you are well informed about the disease conditions of these animals, and thus many a veterinary call is withheld on the owner's part on account of such suspicions.

Need of More Livestock Knowledge

In the business world it is universally accepted that the greatest success is attained by being able to talk intelligently about your customer's shop or business. This principle perhaps applies with immeasurably greater force to our profession in relation to livestock affairs other than disease conditions. Just as soon as the veterinarian can convince his community, or even the leading animal husbandman of the community, that he is familiar with all phases of livestock breeding and production,

he will at once find a much wider field of consultation and practice awaiting him. The main point I wish to bring out is that the practitioner of today and tomorrow must be able to do a great deal more than simply make abstract calls, administer hypos, prescribe after treatment, and lastly collect his fees. Let us not have it said that veterinary practice has degenerated into a cold-blooded business proposition.

The twentieth century breeder is inspired to high ideals and greater and bigger things in animal husbandry. In order to realize his ambitions and reach his goal he is reaching out for, and badly needs, someone near at hand on whom to call for suggestions, advice, counsel and real assistance, in matters pertaining not only to the sanitation and hygiene of his animals but also to their breeding, production and nutrition. My candid opinion is that the local veterinarian is the logical man of a community to occupy that position of honor, trust and confidence with the livestock interests. I further contend that it is within the capability of the average veterinarian to educate and develop himself to the point where the stockmen and the public in general will look up his good counsel and valuable services as being indispensable to success in their industry. Such recognition can not be expected by the young graduate just coming out, or the veterinarian who has just changed locations nor the old resident practitioner who has gotten into the habit of letting things drift and has not heretofore shown an inclination to mix in livestock affairs. It rarely can be accomplished overnight by some "lucky strike" on the part of the man. It usually requires a long, persistent and conscientious campaign on the part of the veterinarian to reach such an enviable position. However, one who sets out to accomplish this end, by applying himself with genuine endeavor and earnest devotion, will find himself year by year improving his position with the stockmen and the general public, convincing them of the assistance and benefits which they are deriving from his efforts. When once you are strongly entrenched in the confidence of your clientele with a high degree of esteem and respect, they will no longer take long chances on cheap empiricism and uncertain home remedies, but will call you upon the slightest provocation and for very trivial disturbances. Spirit and action of this nature on the part of the owner, combined with ingenious

diplomatic manipulations of the competent and reliable practitioner, will certainly go a great way toward bringing out all the possibilities in our new and undeveloped resources in the realm of practice of cattle, sheep, hogs and poultry.

Livestock is the "bread and butter" of the veterinary profession. I believe we owe it to the industry as well as to our own existence and welfare to take an active part in both helping to "knead the dough" and "work the butter." Therefore it behooves every veterinary practitioner in the land to take advantage of all available opportunities to inform himself better and fortify himself more strongly for the much coveted position of livestock adviser and sanitary expert for the community, by adding to his animal husbandry and sanitary and hygienic knowledge by every possible means. It is fully acknowledged that the graduate just out of college can not be expected to fulfil such a mission ideally from the start. However, he should realize that his graduation means only a commencement, and if he wishes to remain an entry in the arduous race of the future he must resign himself to being an earnest and constant student to the end of his days.

Many things can be done to obtain the necessary livestock knowledge and the ultimate confidence of the stockmen. First, it is essential that the veterinarian surround himself with a good animal husbandry library consisting of the reliable, recognized books and texts written by men of authority on the different subjects. Supplement this with some of the leading current livestock journals or magazines, and above all do not fail to have your name placed on the mailing list of the United States Department of Agriculture and of the leading experiment stations which are engaged in investigational work along animal husbandry lines. These latter bulletins and circulars can usually be had for the asking, or a few cents per copy, and will serve as an invaluable aid in keeping up to date in the various phases of the work.

Secondly, be sure to affiliate yourself with every progressive livestock movement, and moreover become a member of as many livestock organizations and associations of your community as possible. In some organizations membership can be obtained only by being an owner of a particular breed of livestock. That is a good prerequisite and may in some cases prove the stimulus to move some veterinarians to become the owners of some class

of purebred livestock, which in turn would bring them into closer touch and deeper sympathy with animals in general. Even a single male or female will allow your admittance, which would place you within the inner circle of a large number of men where you could not only add materially to your stock of animal knowledge but do some general extension work along the line of sanitation and hygiene.

Improve Your Professional Status with the Public

Aside from the foregoing suggestions, which apply mainly to the livestock classes, one should ever be ready to improve all opportunities to elevate his standing and establish his professional status with the public at large. There are many occasions in the course of community functions and activities wherein the progressive veterinarian can work in with some impressive and valuable educational service. Lack of appreciation can often be traced to ignorance and erroneous views on the part of the laity, and it is a part of a veterinarian's duties to correct those views and attempt to place them right by consistent educational propaganda. The livestock meetings, farmers' institutes, and possibly farm bureau and county agent meetings, as well as general community meetings for civic improvements, all at some time or another will afford you your opportunity. Be sure you are ready to take advantage of the opportunities as they occur. Everybody is interested in the sanitation and hygiene of milk and meat, but the majority of the masses are partially or totally ignorant of the many possibilities of these products conveying disease and epizootics to the human family. If the veterinarian would only make the most of these subjects by carefully laying the situation before his constituents he would soon arouse public sentiment to the point which would result in the tuberculin testing of virtually every cow which contributes milk and dairy products to his home town, and also perhaps stimulate a meat inspection service.

It is even advisable for one to do some good extension work among the women's organizations. Do you know that you can take one tuberculous hen before a community meeting of housewives, and with a thorough demonstration and a thirty-minute discussion create unbounded enthusiasm and interest? While many of these same women had been previously only lukewarm toward your cause, or perhaps hadn't the least idea of the

animal plagues that may come to the human family through dumb creation, a majority of them will now become inspired with a new idea of the importance of your work, and will probably become boosters for you and your cause to the end of their days.

It would be difficult to enumerate the dozen and one ways by which the enterprising veterinarian can implant himself in the hearts and confidence of a community, both professionally and as a loyal, trustworthy citizen.

Perhaps not the least important thing, and one not hitherto given due consideration by all veterinarians, is going about your work in a strictly professional way and with a seriousness and diligence which will command the respect of your clientele. Much too often do we hear the stockmen say: "Yes, I called the veterinarian, but he did not seem to take much interest in the case. He walked up to the animal, asked a few questions, wrote me a high-priced prescription, charged me ten or fifteen dollars, and drove away." While I am not saying that a few cases can be handled satisfactorily in that manner, the fact is that the majority of them can not. Furthermore, the policy is entirely wrong. It involves an utter lack of sense of duty, the absence of scientific application of the principles of veterinary medicine, the failure to give adequately for value received, and above all in many instances results in the next call being given to some empiric who will charge only five or seven dollars, and perhaps give the owner as much or even more for his money, and in the end give better general satisfaction.

This last factor of satisfaction must be kept uppermost in the mind of the practitioner at all times. It is only a natural manifestation of human nature to expect service commensurate with fees charged, and the stockman is no exception. Even in apparently trivial conditions it is good judgment to go about gathering the history and arriving at a diagnosis in a systematic and scientific manner. In addition to the satisfaction which conscientious and careful effort of this nature is sure to convey to your client, it likewise serves as a safeguard to the practitioner himself to prevent him in some instances from overlooking some deep-seated trouble of a grave nature which was not manifesting itself by prominent, potent symptoms.

The science and art of making a thorough and complete survey of sanitary and hygienic conditions often requires much patience, diligence, skill and tact in order to bring out all underly-

ing facts and conditions, and on not a few occasions there will be room for exhibition of talents of a high order in ferreting out diseases and tracing them to their very origin. The practitioner should not lose sight of the fact that the field, the farmyard, the stable, the fold and the sty are his workshops and laboratories in which innumerable opportunities are presented for the application of the highest scientific attainments. The oft repeated though erroneous saying that "you can be too scientific for a good practitioner" is all "rot" and will not bear critical analysis.

Again to quote the great Osler, who said "there can be no teaching without a patient—the patient is the best teacher," well illustrates the excellent position of the practitioner for study purposes. If he will, he can develop himself into a specially trained observer. And observations of facts and clinical conditions carefully recorded by specially trained observers such as the practitioners should be, may lead to new ideas and conceptions concerning disease by the practitioner himself, as well as suggest to the pure scientist possible new lines of investigation.

Special Features — Tuberculosis Control

Looking forward from the present, we have before us some exceedingly important questions and problems which require considerable enlightenment and education of the public before an efficient and economic solution of them can be reached. Three years ago the Federal Government through the Bureau of Animal Industry, cooperating with the various State sanitary boards, initiated what is known as "tuberculosis eradication under the accredited herd plan for purebred cattle." About the same time many States also began in a limited way some circumscribed area eradication work on the same disease. Although both of the movements combined are making but slow progress, when compared with the millions of cattle in the country, they are forerunners to and the starting point of the greatest sanitary project in the world—the ultimate nationwide eradication of tuberculosis in cattle.

That this stupendous project may be pursued with the hearty cooperation of all concerned, an enormous amount of educational work is necessary to crystallize human sentiment and to develop a well-directed public opinion for its sanction and unre-

stricted support. Among others, the local practitioner in his daily contact with stockmen occupies an admirable position to conduct a man-to-man campaign for the cause. In so doing he could prepare the correct mental attitude and pave the way for the necessary public cooperation. The people should be given the facts in the case. They should be informed that it will require at least a quarter and possibly a half century, and that such a program would of necessity have to be carried out gradually so that there would be no collapse or famine in our dairy and meat products.

While the work in both the accredited herd plan and circumscribed area testing is being done now by Federal and State sanitary men, the annual retest will in all probability fall to the local veterinarian as soon as the preliminary features of the work have been completed. Therefore it is imperative that every veterinarian in the country put his shoulder to the wheel and do his share by word, deed and action to help put the public in a receptive mood for the work. It not only means a useful public duty, but will result in a consistent and dependable source of service for every practitioner who will be able to qualify for the work.

The Horse Question

Again, Mr. Practitioner, what are you doing in your community about the horse situation? After the motor-power wave of enthusiasm has somewhat subsided, and the financial condition of the country will no longer endure a reign of extravagance, we are going to arrive at the sane conclusion that there is a certain amount of work requiring motive power that can be furnished best and most conveniently by the horse. During the experimental stage of motor power, through which we are now passing, all has not gone well from an efficient and economic point of view. As we approach normal conditions we will again be compelled to reckon costs upon a "dollars and cents" basis, and the public will then learn that it will have to depend upon the horse for so much power for certain kinds of work.

What is the situation? Horse breeding has been reduced approximately 75 per cent during the last two years. If this condition continues a few more years there will exist a real dearth of horses. When the public awakens to the fact that it actually needs horses there will be no animals available for

the market and the demand, and consequently it will be forced to fall back on motive power to serve its purposes. This would be a sad state of affairs, and the veterinarians can perhaps do more to avoid it than any other class of people.

Up to three months ago, when general depression struck the country, the horse market quotations showed that horseflesh over and above 1,400 pounds in good draft types brought from 25 to 30 cents a pound. This clearly demonstrated that good big horses were very profitable livestock and a product that one could well afford to raise. The demand for small and medium light horses is practically nil, but there will always be service for good heavy drafters. It appears as though one could give no better advice than to urge all owners of good big mares of good type to begin breeding at once wherever desirable sires can be procured for mating. Again it devolves upon the veterinarian to spread the gospel of this need and to serve as the most important means of spreading the necessary education to stimulate the breeding of horses of serviceable type and size.

Develop Sterility Resources

It has developed in recent years that much can be done in the way of restoring a large percentage of apparently sterile cows to physiologic reproduction. This opens up a very promising field in many localities for practitioners who are qualified for the work. The results obtained by veterinarians who have followed this line in a systematic and scientific manner are very encouraging and certainly justify the average practitioner in preparing himself to handle that practice in his community.

As a rule the local verterinarian is neglecting to develop this resource, principally because he has not had special training for it. While the most of this work has been done by men who have followed it from an investigational standpoint, the average cautious, conservative veterinarian can fit and develop himself to a fairly high degree of accomplishment if he only determines to do so.

Inasmuch as the older practitioners did not have the opportunity of obtaining special training in sterility work in their collegiate courses, they are compelled to work out their own salvation to a large extent. Owing to the fact that the work is in its infancy, special literature pertaining to it is rather scant. Texts and monographs on the subject are not to be had at this

time, and one will have to depend upon the current literature of the day and information gathered from discussions and demonstrations put on at veterinary association meetings and veterinary short courses by men who can speak from experience and with authority.

As a preliminary procedure in this work it is advisable for one to familiarize himself thoroughly with the gross anatomy of the female generative organs of the cow. This can be done best at the larger slaughtering establishments where one has the opportunity of examining the organs of a large number of animals. In the course of such extensive examinations you are sure to encounter a number of pathological conditions, which will also greatly add to your stock of knowledge.

Having obtained a good knowledge of both the normal and pathologic anatomy of the reproductive organs from observation and palpation outside the body, and combining this with the best obtainable theoretical information from the above-mentioned sources, you are ready to apply the greatest of all educational principles "learning to do by doing."

It is best to begin operations upon animals of not much value, and exercise great care and caution in your mechanical manipulations. Keep well in mind that you are dealing with delicate organs, and avoid all undue abuse of them in so far as possible. Following the theory that "practice makes perfect," it is well to keep your hand in by practicing whenever the occasion presents itself.

It is readily conceded that your clientele will grant you far greater credit and recognition for smaller returns in sterility work than that of most other lines of practice. On account of the greater cost of this kind of service it is confined mainly to purebreds and high grades. It is also a line of practice in which the breeder does not expect 100 per cent recoveries. Often the production of one calf from the owner's favorite fancy prize-winning animal, which he believes hopelessly barren, will give you unequaled prestige, unlimited community recognition, and, most of all, probable life-long patronage. The remuneration from this service alone will range from $200 to thousands of dollars annually, depending upon the number of valuable cattle in the community, and the practitioner's proficiency in dealing with the condition. Begin now to prepare and fit yourself for

this work so that your old established clientele will not be compelled to go outside for assistance and service in this line.

The County Agent

We have sufficient evidence before us that county agents in certain localities are inclined to dabble more or less in matters strictly veterinary. In some instances the field agents are not directly at fault, as it is sometimes a part of the general policy of the directors of agricultural extension, by whom they are employed. However, the greater percentage of the intruders are over-ambitious men who deliberately reach out as far as they can in attempting to show the farmer that they are "jack of all trades" and a panacea for all their troubles.

Unfortunately the very root of this trouble is implanted deeply in human nature. A large number of persons are always on the lookout for "something for nothing," something free, and the stockman-farmer is no exception. The county agent, being a dispenser of general free information, is often appealed to by the farmer for advice and suggestions regarding livestock matters. Incidentally, he soon begins to tell the agent about some ailing animal, and before he is well aware of it he is lured into veterinary consultation and openly asked what is the best thing to do. The average field agent does not have sufficient courage to tell him to call a competent veterinarian. Indeed, thinking perhaps that it is his duty to help him out, or possibly that he might increase his prestige somewhat, he takes a chance and does a "little doctoring." The farmer tells his neighbors, and they expect him to render them similar service. The custom is established, the practice is cultivated, and within a short time it is difficult for the agent to stop it; and so it goes until he makes some costly mistake. The policy is a poor one, both from the view-point of veterinary science and livestock interests, and the most of these short-sighted individuals come to grief sooner or later by being led out of their element or by overstepping their bounds.

What can be done to relieve the situation? Since practices of this sort are not influenced or controlled by a code of ethics, and, moreover, as they do not come under a ban of established laws and regulations, it appears as though it remains for the practitioner to make the most of conditions for the present. Again I would emphatically urge the advisability of the veter-

inarian measuring up to and preferably excelling the county agent in general livestock knowledge, that he may be looked upon as the livestock authority and general animal industry adviser and leader in his territory.

Lastly, is it not possible for the veterinary practitioner in most cases to win over and convert the average county agent into a valuable asset, before he develops into a burdensome liability and partial competitor, should he be so inclined? Go out at once, before there is any occasion for animosities to arise between you, and at all odds make friends and possibly cultivate companionship with the county agent. Visit with him at leisure times; discuss with him agricultural conditions and problems, with him occupying the role of authority and you a good listener. When you have worked into his confidence, incidentally begin to show him diplomatically, by inference, precept and illustration, that veterinary medicine has many pitfalls, and in a large percentage of cases he will soon see that he can not afford to take chances on falling into some of the "pits," and he will gladly tell the farmer to call a veterinarian who is proficient and reliable. Don't misinterpret me to say that all of them could be transformed in this manner; but I sincerely believe that if they are approached and schooled in the proper way at least 85 per cent of them could be converted into actual aids and helpers in your practice. I certainly consider them a resource well worth attempting to develop.

Try it. You can not very well make conditions worse, and you may greatly add to your patronage and at the same time avoid many embarrassing situations.

We have attempted to come out into the open, and discuss freely, frankly and impartially what we consider some of the most important problems and needs concerned in the future of veterinary science. Many more items could be taken into consideration, which would help to support the contention we are making. However, we believe that we have selected a sufficient number of topics to give us more than faint glimpses of wide fields which have been too much neglected in veterinary resources in the past, and which demand in the future earnest endeavor and cultivation by the entire profession.

With a thoroughly educated veterinary profession, both normally and intellectually, and with a greater animal husbandry

knowledge and deeper sympathy with livestock affairs in general, together with an educated and well-directed public opinion, there will be created a correspondingly wider field of veterinary service, and we believe that the material interests of the profession will then largely take care of themselves.

The present period of depression and financial stress is universal, and applies in a like manner to practically all businesses, industries and professions. The restless spirit of the times is but temporary and should cause no undue pessimistic apprehension. However, this is no time to destroy ideals. On the contrary, they should be constructed with deeper conviction and greater hope than ever before. At all times the veterinarian should keep foremost in his mind the old saying that "faith, industry and self-reliance conquer all things," and that the skillful application of principles and the faithful fulfillment of the public trust and confidence will lead to the condition of continued and increased remunerative employment in the future.

TUBERCULOSIS CAMPAIGNS COMPLETED IN SIX COUNTIES

Six counties have completed county-wide testing campaigns to eradicate tuberculosis, and several others are now doing similar work. The counties having tested the animals in every herd are: Barron County, Wis.; Clay County, Miss.; Hinds County, Miss.; Clatsop County, Oreg.; Island County, Wash.; and Gallatin County, Mont. Cattle in the District of Columbia have also been tuberculin tested annually for a number of years.

County-wide testing—called area work—is regarded as one of the most effective ways of controlling tuberculosis. Herds from which reactors are removed are retested from time to time to make certain that the disease is entirely eradicated.

The recent exposure in Western Ohio of "Doc Nolan" and his fraudulent remedy for hog diseases, "Noxine," is described in the *Prairie Farmer*, which also recounts the operations of this fake medicine vendor during the past seven years, and the efforts made by farmers, farm organizations and federal agents to bring technical evidence against the man and stop his dishonest practice.

THE EPIDEMIC AND EPIZOOTIC SIGNIFICANCE OF THE DIFFERENT TYPES OF THE TUBERCLE BACILLUS [1]

By E. C. SCHROEDER

Superintendent, Experiment Station, United States Bureau of Animal Industry, Bethesda, Maryland

THE different types of the tubercle bacillus, it would almost seem, have been discussed often enough and at sufficient length, and, it might be added, with sufficient emphasis, to have exhausted the need to say anything more about them. But the questions that are still being asked imply that this is not true, and the matter that has remained clouded with uncertainty in many minds, though it is a factor of major importance in its bearing on the nature of our various antituberculosis activities, is the relation of the different types to epidemic and epizootic manifestations of tuberculosis.

An impartial study of the available evidence leaves little doubt that tubercle bacilli may be divided into at least three clearly distinct types—the human, the bovine and the avian, and no one acquainted with the numerous unsuccessful attempts that have been made to transform one type into another will be led far astray by superficially plausible transformation theories, or find encouragement in such theories for the belief that the distinctive characters of the different types lack permanence or stability.

By this I do not mean to say that the tubercle bacillus shows absolutely no variations under different conditions of growth and multiplication, as even the late Dr. Robert Koch, a positive and certainly the most authoritative advocate of the stability of the different types, frankly admitted that determinable variations, alike in morphology and virulence, of a kind that lack value as evidence to prove that one type may be transformed into another, had been recorded.

The tubercle bacillus, without doubt, is gifted, like most organisms, with a fair degree of plasticity, which enables it to conform in some measure to the requirements of its environment, but this does not account for the difference between the several

[1] Presented at the Tuberculosis Eradication Conference, Atlanta, Ga., May 3, 1921.

types. Neither can the difference be explained by the assumption that it is a question of pathogenic virulence correlated to some extent with no greater variation in morphology than we find in many true polymorphic organisms. This is well illustrated by the respective pathogenicity of the different types for two animals widely used in tuberculosis investigations. Guinea-pigs are highly susceptible to the human and the bovine types of the tubercle bacillus and strongly resistant against the avian type. Rabbits are strongly resistant against the human type, which readily attacks guinea-pigs, and are quite susceptible to the avian type, against which guinea-pigs are strongly resistant. If the difference were purely a question of a degree and not of a kind of pathogenicity, either guinea-pigs would not be more vulnerable to the human type than rabbits or rabbits would not be more vulnerable to the avian type than guinea-pigs. The more this difference in the kind, as distinct from a degree, of pathogenic virulence is studied with different species of animals, the stronger and more convincing the evidence on which it is based is found to be.

The theory that the tubercle bacillus is an actively mutating organism, of which the currently produced types best adapted to the environment in which it lives and multiplies gradually become dominant and crowd out other forms, was at one time very attractive to me, and it was my opinion that it would eventually be proved. It is in harmony with the widely entertained belief that most tuberculous disease among human subjects, irrespective of the age at which it asserts itself through symptoms, is caused by tubercle bacilli that entered the body during childhood, and the fact that the bovine type of the tubercle bacillus is found frequently in the tuberculous lesions of children and rarely in those of adults, and the discovery of exceptional or aberrant types of the tubercle bacillus, seemingly intermediate between the human and the bovine types. But it has remained wholly unsupported by eagerly sought, unimpeachable experimental evidence, and can not now be accepted as tenable, particularly as the required evidence could easily have been procured and soon would have become very abundant if the transformation of the type of the tubercle bacillus through the influence of its environment were common enough to require consideration as a practically significant event.

In our thoughts on transformation we should bear in mind that we have no valid reasons to believe that the environment in which an organism lives and reproduces itself tends to induce or engender adaptive, heritable modifications that contribute to its welfare or insure its perpetuation. All we know about the functions of the environment in the development and establishment of new types, varieties and species is that it selects and preserves desirable and discards undesirable variations. The heritable variations or mutations, equally the selected and the discarded, result from undiscovered causes. Hence, unless the tubercle bacillus is an organism which, through the action of unknown causes, more or less continuously produces its various known types, each ready to be selected or specially favored by the environment in which it happens to be located, transformation can not serve as a reasonable explanation for the commoner occurrence of the different types in different species of animals or at different ages in the human species. And if the bacillus currently produced its different known types, an enormous number of successful transformation experiments would have been recorded, and the gradual change from one type into another would have been observed time and again.

It is fortunate, too, that the speedy transformation of the tubercle bacillus from type to type and its better adaptation to a number of different environments is not a common phenomenon, otherwise we would be confronted in our antituberculosis work not with three distinct types, each with a reasonably determinable or measurable significance, but with a protean pathogenic organism which, in addition to its common human, bovine and avian types, could hardly have failed to produce also porcine, bovine, canine, feline, equine and many other types each of which would be at once particularly pernicious for some one species of animals and would, moreover, harbor the evil potency for the rapid development of a high specialized perniciousness for any and all other species, and the separate eradication of human, bovine and avian tuberculosis would be a hopeless dream and its attempt a futile waste of time and energy.

A better argument against the transformation theory can hardly be found than two well-known facts, namely, that no species of warm-blooded animals is wholly immune against all types of the tubercle bacillus, and that no satisfactory proof has

been obtained to show that the number of types has increased through their growth and multiplication in a large number of different species of animals. I say this though I am acquainted with the rare isolation of alleged unusual types from species of animals, like reptiles and fish, that are ordinarily regarded as immune against tubercle bacilli. Even the epizootic frequency of tuberculosis among hogs has not resulted in the transformation of the tubercle bacillus of the bovine type into a true porcine type.

Now, having a group of closely related but truly distinct organisms which act as the prime etiological factors of a disease that attacks many widely different species of animals, what is the significence of each of the several organisms with regard to the epidemic and epizootic occurrence of the disease? The answer to this inquiry, I believe, can readily be found through an analysis of the reasons we have for speaking of the several organisms as human, bovine and avian types.

We have a good reason for speaking of the human and bovine types as "mammalian," as they rarely attack other animals than mammals; and the reason for the name "avian" is equally good, as this type rarely attacks other animals than birds. Of the more specific designation, the "human type," we may say that this similarly is reasonable, because this type is more commonly found in human subjects than any other type and is of rare occurrence in the lower animals. But when we come to the "bovine type," in view of statistics like those supplied by our meat-inspection service, which indicate that it attacks hogs as often as cattle, if not oftener, we must hunt for a different and better reason to justify its name than the frequency with which it occurs in one or another species of animal. And we do not have to hunt long to find an excellent and convincing reason.

The tubercle bacillus is a parasite; the victim of tuberculosis is its host; it is not only a parasite but an obligatory parasite, which, separated from its host, neither grows nor multiplies. After the parasite is expelled by one host it must soon enter another, else it is doomed; and unless it is expelled by its host before the latter dies it is also doomed. Further, it is a delicate, nonsporulating bacterium, easily killed by exposure to light; it has no independent power of locomotion; it can not be transported by currents of air more than a few yards without losing its virulence or ability to multiply in its hosts; and tuber-

culous disease, or the result of the true junction between the parasite and its host, usually requires long continued, frequently repeated, or intense exposure of the host to the parasite. From these statements it will be apparent that the parasite, to insure it against extermination, must be related to its hosts in a way that provides for its ample multiplication and its free, abundant and long continued dissemination.

The relationship between the human type of the tubercle bacillus and human beings and between the bovine type and cattle is of a kind that makes these provisions. In both cases the lung, an organ in free communication with the exterior of the body, is a common habitat of the parasite; in both cases the tuberculous lesions in the lung break down and discharge their contents into the air passages; in both cases the tuberculous material, charged with the parasites, is coughed up and reaches the mouth; in one case it is largely expectorated, often in a careless, dangerous way, and in the other it is swallowed and the tubercle bacilli it contains pass through the digestive tract without loss of virulence and out of the body through the rectum; in both cases material infected with the parasites is sprayed from the mouth and nose during coughing and other forcible expiratory efforts; in both cases the disease is usually chronic, slowly progressive, long enduring in character, which insures that its victims may long remain agents for the dissemination and perpetuation of the parasites; and in both cases the dissemination often begins long before the danger is recognized or suspected. Plainly, human beings are ideal hosts for the human type and cattle for the bovine type of the tubercle bacillus. In both cases we have bodies in which the respective types multiply abundantly without causing marked or observable disturbances of health in the earlier stages of their parasitism, in locations and with the production of lesions which facilitate their expulsion and dissemination, and this expulsion and dissemination, as notably favorable for the perpetuation of the parasite as it is dangerous for its prospective hosts, may continue, with contantly increasing activity, not for days and weeks and possibly months, as is the case with the parasites of more acute self-limiting bacterial diseases, but for years.

When the bovine type of the tubercle bacillus inhabits the human body the conditions are quite different, and cattle are so

highly immune against the human type that it requires no consideration whatever in bovine tuberculosis eradication projects. The bovine type truly multiplies in the human body, but remains so locked up in closed lesions in this otherwise favorable host that we may conclude with considerable assurance that tuberculosis among human beings, caused by the bovine type of the tubercle bacillus, contributes nothing to the perpetuation of this kind of tuberculosis or its parasite, and that practically every case of tuberculosis in human subjects due to bovine tubercle bacilli must be charged to intimate contact, in most instances through the ingestion of contaminated dairy products, between persons and tuberculous cattle.

The relative frequency with which the bovine type of the tubercle bacillus attacks hogs and cattle, taken by itself, would lead to the conclusion that either of both of two names, "porcine" and "bovine," would be proper for it; but the moment we realize that tuberculosis among hogs and tuberculosis among cattle have no true reciprocal relationship, in that tuberculosis among hogs is almost entirely dependent, like bovine tuberculosis among children, on their exposure to tuberculous cattle, and that tuberculosis among cattle is in no respect dependent upon the exposure of cattle to tuberculous hogs, we see that the bovine type of the bacillus is correctly named and that it would be an error to designate it as porcine.

The fact of the matter is, though tuberculosis among hogs has reached an epizootic character, the host and parasite relationship between the hog and the tubercle bacillus does not adequately insure the perpetuation of the parasite, and tuberculosis among hogs, like bovine tuberculosis among children, is therefore purely an adjunct or an appendage of the widespread prevalence of tuberculosis among cattle. In other words, tuberculosis among cattle is a great, self-sustaining, self-perpetuating plague, and bovine tuberculosis among children and tuberculosis among hogs are its attendant, accompanying, incidental or concomitant evils, which are not self-sustaining or self-perpetuating, and not even reciprocally related to the cattle plague which gives them their origin. Hence tuberculosis among hogs and bovine tuberculosis among children are plagues which can not be controlled by measures which deal with the victims of the disease, but which would rapidly subside if the exposure of

children and hogs to tuberculous cattle were prevented or tuberculosis among cattle eradicated.

Regarding the comparatively rare occurrence of tuberculosis among other species of mammals than those that have been mentioned, it does not seem necessary to say much about them, as they are unsatisfactory hosts for the tubercle bacillus for one reason or another, and the occasional presence of the disease among them contributes nothing to its perpetuation. We must not imagine, however, that it is a high degree of immunity which invariably protects a species of animals against tuberculosis, as excessive susceptibility, though seriously dangerous for the infected animal, may well serve as a factor of safety for its species. For instance, guinea-pigs have so little immunity against human and bovine tubercle bacilli that have actually entered the tissues of their bodies that they succumb to generalized tuberculosis in the course of a few weeks after infection; yet healthy guinea-pigs, exposed in a tuberculous environment, contract tuberculosis very slowly. Hence it follows that tuberculous guinea-pigs, because of their lack of immunity, or the lack of resistance that their bodies offer to the multiplication of tubercle bacilli, die too soon to make the dissemination of tubercle bacilli from their bodies a sufficiently common cause of tuberculosis to provide for the perpetuation of the parasitic germ.

As a matter allied to, but really distinct from, the kind of transformation of the different types of the tubercle bacillus that we have been discussing, it may be well to say a few words about the possible development of new types. That the tubercle bacillus is a mutating organism must be admitted, unless we wish to deny the abundant and convincing evidence that proves the occurrence of aberrant or atypical types. Hence it is reasonable to assume that a mutation form may at some time occur that will bear the same relationship to a species of animals which does not now serve to perpetuate tubercle bacilli which the human type bears to human beings and the bovine to cattle. This would supply the material for the evolution of a new type in a way probably similar to the origin of the several existing types from a parent stock of so-called acid-fast organisms, or the evolvement of any one or more of the existing types from a previously existing type which served as the parent stock.

While this assumption is not based on other available, tangible evidence than the mutating character of the tubercle bacillus,

it should not be too lightly dismissed. It is particularly interesting in connection with the increasing frequency of tuberculosis among hogs, especially as bovine tuberculosis among hogs is not as far from the status of an independently possible or a self-maintaining plague as bovine tuberculosis among children, or either human or bovine tuberculosis among guinea-pigs, notwithstanding their high susceptibility. Considerations of this kind help us to appreciate that the eradication of tuberculosis, wholly apart from whether it is human, bovine or avian, can not be pushed forward too quickly for the future health and welfare of the world.

From these statements, which show, I hope with some degree of clearness, that the different types of the tubercle bacillus have been correctly named, I believe we may draw the following conclusions regarding the epidemic and epizootic significance of the different types.

1. The epidemic, or rather pandemic, prevalence of tuberculosis due to the human type of the tubercle bacillus is caused by tubercle bacilli that multiply in and emanate from tuberculous persons. Nothwithstanding the vast epidemic importance of this plague, it has no significance as a cause from which an epizootic prevalence of tuberculosis may arise.

2. The occurrence of the kind of tuberculosis among human beings that is caused by the bovine type of the tubercle bacillus is wholly chargeable to the epizootic prevalence of tuberculosis among cattle. While it is a serious evil which should be fought with unremitting energy, it does not lead to the dissemination of tubercle bacilli, and therefore has no significance as a cause which contributes to the perpetuation of tuberculous disease.

3. The widespread, common, practically epizootic prevalence of tuberculosis among hogs is chargeable to the epizootic prevalence of tuberculosis among cattle. Its importance as a cause which contributes to the perpetuation of tuberculosis is insignificant.

4. The epizootic, really panzootic, prevalence of tuberculosis among cattle is entirely due to the bovine type of the tubercle bacillus, and tuberculosis among cattle is a great self-perpetuating plague, which, because of its nature and the character of its causative agent, in addition to the harm suffered by cattle, derives a further important significance from the fact that it is the cause of the epizootic prevalence of tuberculosis among

hogs and the too common occurrence of the bovine type of the disease among children. In other words, the bovine type of the tubercle bacillus is a pathogenic parasite which is not only seriously destructive to its specifically true host, but a parasite which, making its attack through its true host, also causes tuberculous disease, epidemic and epizootic in character, in foreign hosts, through which it does not perpetuate itself.

5. The epizootic prevalence of tuberculosis among fowls is dependent upon the avian type of the tubercle bacillus, which lacks the power to serve as the cause of an epidemic or an epizootic occurrence of tuberculosis among mammals.

6. The human and the bovine types of the tubercle bacillus have no significance as a cause for the epizootic development of tuberculosis among fowls.

The difference in the pathogenic ranges of the several types of the tubercle bacillus is very impressive. It seems clear in the light of our present knowledge that the human and the avian types, though they occasionally are found in other than their specifically true subjects or hosts, are each responsible for only one plague-like manifestation of tuberculous disease; but the bovine type, though its perpetuation depends almost entirely on its growth and multiplication in its specifically true host, the bovine species of animals, is the true cause of three important plagues, a human, a bovine and a porcine, and in addition to this is responsible in most instances for the less common occurrence of tuberculosis among other domestic mammals than cattle and hogs. It is the supremely pathogenic type of the tubercle bacillus.

The legislature of Washington has recently enacted legislation providing that all cattle over one year of age must be tested for tuberculosis and receive a certificate of health at least six months before being exhibited at fairs in the State.—*Hoard's Dairyman.*

"One of the most constructive pieces of legislation passed by the General Assembly of Missouri was the Burch tuberculin test law, which makes testing for tuberculosis compulsory in any herd of 5 or more cows. The owner of such a herd is not even permitted to give away the milk."—*Farmer and Stockman.*

SOME OBSERVATIONS CONCERNING TUBERCULIN TESTING AND TUBERCULOSIS CONTROL

By J. J. FREY

Veterinary Inspector and Pathologist, California State Department of Agriculture, Division of Animal Industry.

WE ALL recognize the fact that very often generalized conclusions are based upon a single observation or too few observations. This is inaccurate and unscientific and may lead to great blundering. For this reason, when a great amount of accurately recorded data is accumulated covering any question upon which the world still seeks information, such data should be so classified and studied that sound deductions may be made.

EXTENSIVE TESTING IN CALIFORNIA

In the State of California, as a result of the operation of the pure-milk law, a public-health measure, tuberculin testing has been conducted on a larger scale than in any other State in the Union. The intradermal test was first given State-wide official recognition in California. With this test 300,000 or approximately one-quarter million tests have been made. The data recorded and the opinions that have been formed as a result of the experience gained in making these tests should be of considerable value in determining the application and adaptation of the test in the future.

VALUE AND LIMITATION

While tuberculin is now so generally recognized as a valuable diagnostic agent for tuberculosis that its use has become permanently established, and while the test has become a boon to the dairy industry and is a valuable guardian of children against the white plague in so far as the milk supply is concerned, its greatest value will never be realized until we fully appreciate its limitations. This, then, calls for a discussion of the efficiency of the test or the various tests together with their peculiar advantages or disadvantages.

SUBCUTANEOUS VS. INTRADERMAL

The subcutaneous, being the first test used extensively, was considered for many years to be the best. Today it is more and more being replaced as the intradermal method gains favor.

The fact that the subcutaneous or the thermal test is cumbersome and time-consuming is not the most serious objection to it. We all recognize that there are many influences that may cause fluctuations of a cow's temperature, making the test inapplicable in some cases, as just before or after parturition, and in other cases making the interpretation of the temperature chart most difficult and probably inaccurate. On the other hand, there is but one thing that will cause a typical swelling at the point of inoculation typical of the intradermal reaction: that is tuberculosis. The intradermal test in the hands of an experienced operator is not likely to err on the side of giving reactions when animals are not affected.

As to the relative value of these two most commonly used tests, in their ability to pick out all of the reactors, I believe that all that can be said is that in some cases cows will react to the subcutaneous when they will not react to the intradermal, and in other cases, within the same herd, cows will give an intradermal reaction when they will not react to the subcutaneous method.

OTHER TESTS

The "sensitized intradermal" test consists in the application of a second injection in the same manner as the first, and at about the same location, on the fourth day following the first injection. This is supposed to be more searching than either the subcutaneous or the ordinary intradermal tests. The limited use that we have made of this test is insufficient to confirm this contention.

The intrapalpebral test is supposed to combine the good points of both the intradermal and the ophthalmic tests. From limited observations which we have been able to give this test it seems to have no points of advantage over the intradermal.

The ophthalmic test has not been much in favor because when used alone it does not detect as many of the tuberculous animals in a given herd as either of the above-mentioned tests. A modification of this test, known as the "sensitized ophthalmic," has recently gained great favor as a means for detecting those advanced cases of tuberculosis known as "spreaders" that will frequently not be found by any other means, except possibly a serological test, which has not yet been sufficiently used in common practice to determine its real value.

The technique of the sensitized ophthalmic test consists in the

application of a disc of dry tuberculin, as prepared for the ordinary ophthalmic test, into the conjunctival sac, being careful to see that it is dissolved. Two days later two discs of the same size are placed in the conjunctival sac in the same manner as before. This should be done in the morning so that observations may begin at an early hour and continue throughout the day.

The possibilities of this test were illustrated recently in a herd of some 60 head that had been tested at about six-month intervals during the past six or seven years, using generally the intradermal, sometimes the thermal, and at other times a combination of the intradermal, thermal and ophthalmic. Into this herd outside animals had been introduced from time to time. Usually one, two or three reactors were found when each test was made. When the test six months previous to the last test was made, five cows reacted to one of the three methods then employed and were removed. At that time there was noted in the herd a cow that was thin and which presented an unthrifty appearance in general, but no reaction to any of the tests then applied was obtained. No external lymph nodes were enlarged and no evidence of tuberculosis, other than the general unthrifty appearance, could be noted. The herdsman said that a very heavy flow of milk, unusually rich in fat, was being given. Her condition was attributed to this fact, and she remained in the herd. On the last test in this herd 19 head reacted to a combination of sensitized ophthalmic and the intradermal, including the above-mentioned cow. In this connection there is another important fact to be noted. Not only did she react to the sensitized ophthalmic, but after six days a swelling began at the site of the intradermal injection and increased in size from that time, but on the fourth day not a trace of reaction had been found upon careful examination.

The story of this herd suggests two things: First, that the very most important reactions to the intradermal test may appear later than the time ordinarily set for the observation; and second, the various tests used repeatedly may fail to check the spread of tuberculosis in some herds.

BELATED REACTORS

Discussing first the question of belated reactors, it will be recalled that two years ago in a lecture before the veterinarians in attendance at the short course at Davis, Dr. A. L. O'Banion,

of the California Department of Agriculture, stated that, while little significance could be attached to the size of a reaction, the later a reaction appears the more likely was the animal to be extensively affected. His conclusions were based upon an examination of the reports of animals tested and slaughtered under supervision of California State meat inspectors. His statement seems to be borne out in the illustration just given; however, the cow has not yet been slaughtered.

Further evidence that these later reactors may appear more frequently than we had formerly supposed is seen in the fact that two other inspectors, working independently, have recently reported the same occurrence, their attention in both cases having been called to it by cattle owners after the regular fourth-day observation had been made. It is also a frequent occurrence that a dairyman upon being shown a number of reactors in his herd will reply: "Yes, I can see them plainly myself now; but last night I examined them all carefully, and there were but one or two that showed any swelling at all."

WHEN THE TEST FAILS

Going back now to the discussion of the second point suggested by our illustration, we find ourselves face to face with the most difficult problem with which we must cope in tuberculosis control, namely, the elimination of the advanced case that is a spreader or likely to become a spreader before a subsequent test.

It seems to be the consensus of opinion that if 80 per cent of tuberculous cattle in a badly affected herd react to any test it is doing well, leaving 20 per cent still in the herd. Among this 20 per cent there are likely to be at least some of the most dangerous spreaders of the entire herd. This 20 per cent can be materially reduced by using a combination of tests. Possibly in most instances by the use of the proposed sensitized ophthalmic test the spreaders may all be detected and removed at the time of the first test. However, a combination of the three best recognized methods for field testing, possibly including the serological test, should be given at the beginning of the attempt to eradicate tuberculosis from a given herd; then if the two succeeding tests at six-months intervals show decreasing numbers of reactors, it may be considered that progress is being made and the prognosis favorable. On the other hand, should a number of reactors appear on each succeeding test, it is evidence sufficient that spreaders still remain in the herd, provided proper

sanitary precautions, such as scraping, draining and plowing corrals and grazing grounds, indicated as an absolute necessity by Dr. J. Traum's experiments recently completed at the University of California, have been observed, and if the barns have been thoroughly cleaned and saturated with a disinfecting solution.

When spreaders are present in a herd and means of detection fail, there remains but one course: Consider the herd 100 per cent tuberculous and proceed to establish another herd, or remove it entirely from any territory from which an eradication effort is being made.

POSSIBILITIES

Now that due consideration has been given to the limitations and shortcomings of the tuberculin test, we must give attention to what can actually be accomplished and what valuable information may be obtained when it is intelligently used.

In one county not a single cow that passed the first general test reacted to the second test. In a northern county but three herds were found affected, and in each case the disease was traceable to outside sources. In another county not a single reactor has been found, due to its geographical isolation, while in an adjoining county where transportation and communication to the outside are easy it is well known that large numbers of tuberculous cattle are present.

OTHER EXAMPLES

In addition to these facts, there are many herds in various parts of the State that have been cleaned entirely by the test, but the following examples are typical of them all:

1. A Guernsey herd of 150 head, 90 of which were milk stock, gave 14 reactors in first test; on second, 5; on third, 1; on fourth, 2 suspicious, which were removed as reactors; fifth, 1 reactor; sixth, none; seventh, none.

2. A herd in Siskiyou County showed on the first test 3 reactors out of 80 head. None have occurred since.

3. In San Diego a herd of 38 contained 4 reactors, was clean on third test, and has remained so.

It should be stated here that it has been shown that the lower the percentage of reactors and the smaller the herd, the more successful is an attempt to eradicate the disease.

It is encouraging to note the great majority of cases that have remained free from the disease where herds have been placed

on the accredited herd list by the United States Bureau of Animal Industry, after having been declared as free. This, however, may be to some extent attributed to the fact that probably not a high percentage of accredited herds originally contained a high percentage of reactors.

CONFIDENCE IN TEST

Another fact of significance is that those who have used the test most place the greatest confidence in it. They all will say that practically nothing can be told from physical appearance whether or not an animal will react, but, given the history of a cow or herd, in a surprising number of instances the result may be predicted correctly; showing a degree of regularity, consistency or dependability that may be credited to the test. Many other occurrences tend to show its great searching value, especially among cattle where the test has not been previously used. For example, there have been noted herds in which cows occupied the same stanchion each time they were stabled. On making observations as one passed down the line, the reactors would occur in groups of five or six standing side by side; the next ten would pass; then three or more gave reactions; several would pass, and then another group of reactors would come. This also illustrates a potent method of dissemination.

In another typical observation a dairyman had kept nine head together in a small corral and barn for two years. Just previously to the test he had purchased six head from the mountains. This was all unknown to the veterinarian until after the test had been completed, and he had found nine reactors and six free, drawing this remark from the owner: "That's funny as hell. I just brought in the six that didn't react, off of pasture. The others I have had here for two years."

Another thing of frequent occurrence is that, upon finding reactors in a herd, an inspector begins to tattoo a "T" in the ear, as now required by the California pure-milk law, whereupon he finds a "T" already present. Upon inquiry it is discovered that the owner had unknowingly bought these cows from a neighbor where they had reacted the year previous. Several veterinarians have stated that, upon examining the remainder of the herd closely, they were agreeably surprised to note the remarkable degree to which all of those having been tattooed, as a result of a reaction the year before, had again reacted.

TECHNIQUE

While the technique of testing is generally well known, it is not uncommon to find veterinarians going through an elaborate process of disinfection before making the intradermal test. This may be all right as a matter of policy or for effect on the owner, but it has no practical value in so far as the test is concerned. Experiments have been made wherein living cultures of colon bacilli and suspensions of fecal material have been injected intradermally without producing a semblance of a reaction. Further, the greater majority of the one-quarter million tests made by veterinarians of the California Department of Agriculture have been made after simply wiping the spot of injection clean, and in no instance, except in cases where an animal would jump, causing the needle to tear the skin, was even so much as a trace of infection noted.

It is claimed by some that it is even unimportant whether or not tuberculin is injected into or under the skin. This may be true; but if we omit sterilization then obviously we must not carry the needle through the skin and into the subcutaneous tissue, or infection would be quite sure to result. This it seems would be a source of difficulty frequently met, even though we attempted to disinfect the needle and the field of operations each time, and permitted ourselves to be careless about penetrating the skin. It is, therefore, best, I believe, to keep our intradermal test strictly "intradermal."

INTERPRETATION OF INTRADERMAL REACTIONS

With regard to interpreting reactions, we have come to recognize any firm swelling the size of a pea or one-half the size of a hazelnut, or larger, as a positive reaction. Match-head swellings and slight thickenings, evidently a hold-over from earlier swellings, are classed as suspicious reactions and are usually found on postmortem to contain no visible lesions. We do not regard those swellings which so commonly appear after one or two days and disappear by the third as positive reactions.

The tendency seems to be to increase the time from injections to observations. Doubtless in tuberculosis eradication work observations should be made more than once, possibly the third and seventh days, or the third, sixth and eighth days.

The following code for recording intradermal reactions was adopted at a recent meeting of the United States Live Stock Sanitary Association at Chicago:

An intradermic test shall be reported in accordance with the following code:

(A) Animals showing no reaction shall be recorded at each observation as N (negative).

(B) Reactors shall be recorded as follows:

***a.* For circumscribed swellings, pea size (diameter 3/16 inch) shall be used as the basic standard. Larger swellings shall be recorded as P2, P3, P4, P5, etc.**

***b.* For diffused swellings, Thick 2X shall be used as the basic standard and signifies a diffuse swelling in which the injected caudal fold is twice as thick as the normal fold. Larger swellings shall be recorded as Thick 3X, Thick 4X, etc.**

TEST SERVING ITS PURPOSE

Is tuberculin testing under the State dairy law accomplishing the thing for which it was intended, namely, the protection of the health of the public against tuberculosis of bovine origin? The reply is emphatically YES.

At the time testing was begun, raw milk from many large dairies where tuberculosis prevailed to 90 per cent of the herd was being sold. Veterinarians remember having visited such herds where the sale of raw milk had been stopped, and noted the visible effects of tuberculosis upon the children of the family who had continued to drink the milk in its raw state. A case is recited in which two of the children bore enlarged tuberculous glands on their necks that could be seen from considerable distance even by an unskilled observer.

Today the products from such herds as these are pasteurized before being sold to the public, as the pure-milk law requires one or the other procedure. In fact, with few exceptions, the products of the larger herds are all pasteurized, and in the case of those in which pasteurization is not practiced they are regularly and frequently tested so that it is not likely that a "spreader" would develop within the brief space of time between tests. In addition to this, the 22,640 smaller dairies, down to and including the one-cow dairy, which have no provision for pasteurizing, are tested annually or semi-annually. This testing extends to the most remote sections of the State as well as populous urban and suburban districts. A case recently given wide publicity throughout the State will illustrate this point.

A family in Sonoma County, having two cows and more milk than they could use, made application for a test. When the test was applied both reacted. The lady began to cry and told the

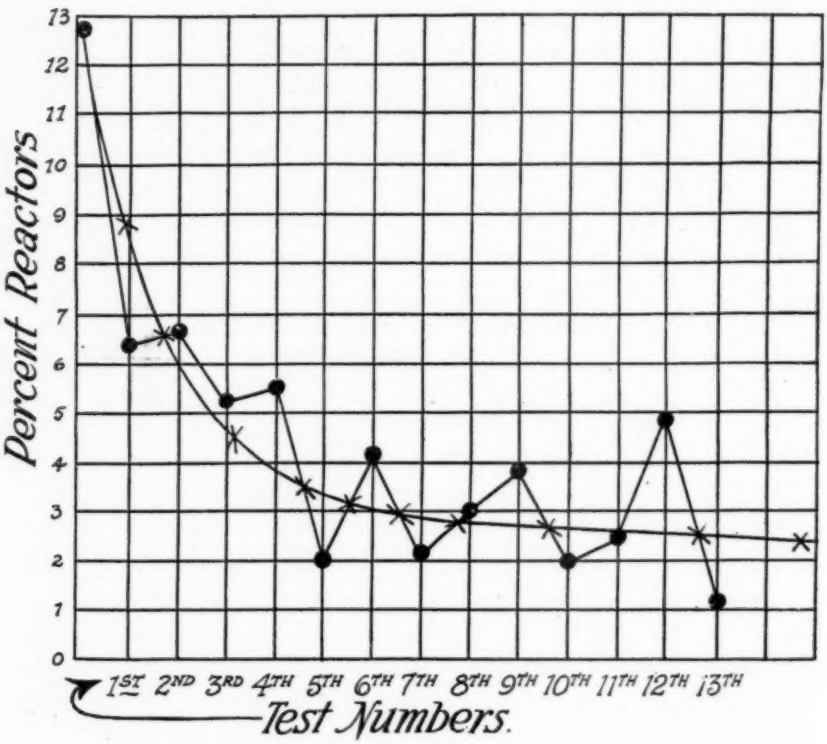
inspector that it was not the loss of the cows that caused her grief, but the fact that their small child whose only food had been the milk from these two cows was recently operated upon for tuberculosis of the bones, and was at that moment lying in a plaster cast and would probably be an invalid the remainder of its life. Upon invstigation it was found that both parents were healthy and all sanitary conditions of the house were good. Certainly the child had contracted the disease from one of the cows, which was a "spreader." Had it not been for the testing of these cows, children of the neighbors purchasing milk from this family would have been exposed and doubtless some would have contracted the disease.

Another case in which the communication of tuberculosis was checked by the test was in a small valley in a mountainous district of California. No case of tuberculosis had been known in the valley before one of the residents bought a tuberculous cow outside the valley and placed her in his herd of five cows. Some time later a veterinarian called to test the herd, as the family was making and selling some butter. This cow and two others reacted. The daughter of the family was at that time suffering from what the family physician thought to be some obscure disease, but which later developed to be acute intestinal tuberculosis attributed to the drinking of milk from these tuberculous cows. The peculiar circumstances surrounding this isolated case can leave but little doubt as to the source of infection. Such examples as these serve to illustrate forcibly the many and dangerous possibilities of consuming milk from tuberculous cows.

Over 20,000 of these tuberculous cows have been removed from raw-milk dairies through the testing done under the pure-milk law. It is estimated that about 5 per cent of the reactors are discharging tubercle bacilli at intervals or continuously through their milk. This means that if it were not for the tuberculin testing done by the State, her unsuspecting citizens would be drinking raw milk from at least a thousand cows actually containing tubercle bacilli. To these should be added the other cows that would have contracted tuberculosis in dangerous form had these 20,000 reactors remained in the raw-milk herds. Add to this total the large number of cows that are "spreaders" in pasteurization herds which, but for the pure-milk law, would be selling raw milk; and multiply this grand total by the milk from all healthy cows with which this contaminated milk from

"spreader cows" would be mixed (for the milk from one cow will contaminate that of a whole herd), and we have an enormous product of contaminated milk that can not readily be grasped, but would include a great portion of our total supply of almost 63 million gallons annually.

The accomanying chart will show the relative degree to which tuberculosis has been reduced among cows in raw-milk dairies.



Results of Tuberculin Testing in California.

Nor has the benefit of the testing been confined to public health. As previously stated, it has enabled many individual herd owners to free their herds completely from the disease, and it has pointed out the possibility and the way for extension of the good work.

THE REPRODUCTIVE PROCESS AND ITS LIMITATIONS BY DISEASE

By W. W. Williams

Springfield, Massachusetts

THE reproductive process may be interrupted at any point. Death of the germinal elements or of the fetus takes place. There is usually a disposition in most men to attempt a separation of the phenomena of sterility and abortion into two clinical entities. In reality this is difficult to do. Sterility may be defined as the inability of an animal to reproduce its kind. Abortion consists in the premature expulsion of the ovum or embryo. All aborters are sterile, while almost all sterile cows abort. If fertilization occurs and impregnation does not take place, or if impregnation does take place and a microscopic embryo is expelled, the cow has aborted and is also sterile. I have thus not considered the subject according to the general understanding, which is that the missed abortions are not taken into consideration. They are not considered abortions. We are interested more particularly in the whole reproductive process; with this, abortion is a very common phenomenon.

In the control of genital disease we are especially concerned in those basic disease processes responsible for the lack of reproduction, and not in the observed abortion as such. Abortion is primarily the result of the death of the fetus, embryo or ovum, and of no disease or infection is death a specific symptom. The obstacles to reproduction commence at the time of the formation of the spermatozoa and the ova and continue throughout the fetal life. We can not disassociate the causes of death of the microscopic embryo from those which later destroy the fetus which is large enough to be observed with the naked eye.

The function of each and every part of the genital tract is very closely co-related and dependent in its proper functioning to that of the general organism. Even as the endocrine system (the glands of internal secretion) exerts its governing influence upon the metabolism and function of the body in general, so does it intimately control the whole process of reproduction. A disturbance or lack of balance of these ductless glands is often the foundation of genital disorders which result in the cessation of reproduction. Along with other factors, this phase of the sub-

ject of reproduction should constantly receive our careful attention.

Because at all stages of the reproductive process there are so many factors which may interfere, one should have a fair understanding of the whole scheme of reproduction before he can hope to control intelligently its shortcomings. In the young heifer, at the time of birth, there exist at least 20,000 immature ova, which, when the heifer reaches the age of 6 to 12 months, should commence to mature. But only a small percentage ever reach maturity. Most of them form what is known as atretic follicles. The ovum develops partially, but the development is stopped, the ovum dies, and the follicle recedes. In so doing there is undoubtedly an important internal secretion turned into the blood stream. It is quite normal that these immature follicles should be present, and they should not be confused with ovarian cysts. One follicle should mature every 21 days, then rupture, the ovum become loosened from its supporting cells and be discharged. The cells lining the sac then commence secreting a material known as lutein tissue, a substance which has an important bearing upon the nutrition of the fetus during the first two or three months. At this stage in the development of the egg it will be well realized that very minute factors may readily cause its death or inhibit its development. Sometimes the egg fails to develop to maturity and estrum does not occur, or the egg may develop and fail to be liberated. The development of the egg may be interfered with by abnormalities in certain glandular secretions. Infection commonly interferes with the liberation of the egg from the sac by producing an inflammatory thickening of the ovarian capsule or an adhesion of the ovary; or the egg may be formed apparently normal and suffer an early death on account of infection in the immediate vicinity.

For the production of a viable calf, it is necessary that both the male and female elements be of high vitality, capable of union with each other, and resulting in the formation of an embryo of such high vitality that it is able to survive during its intrauterine existence. It is not uncommon that weak germinal cells are produced. This phase of the subject is particularly accentuated in the case of the male where impotence, sterility and the production of weak offspring from a given sire are quite frequent. It is a phase of the subject that has received entirely too little attention, and, as common as male infertility is, the

disabilities resulting from it are generally considered as due to disease of the cows, even without any effort being made to ascertain the soundness of the bull.

As with the ova, the development of the spermatozoa is often interfered with. It may be interrupted at any point, the cause apparently being either an inherent weakness or an infection of

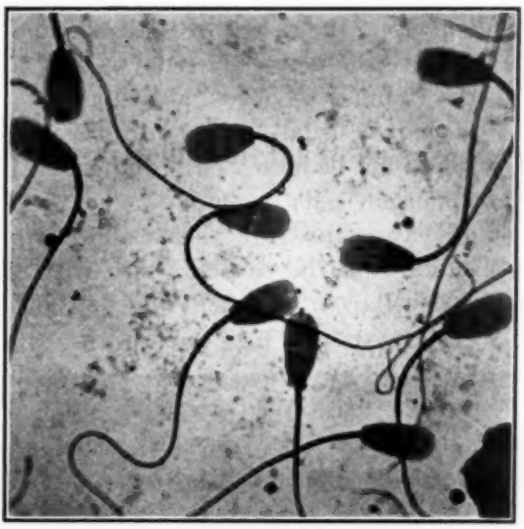


Figure 1.—Normal Spermatozoa from Bull.

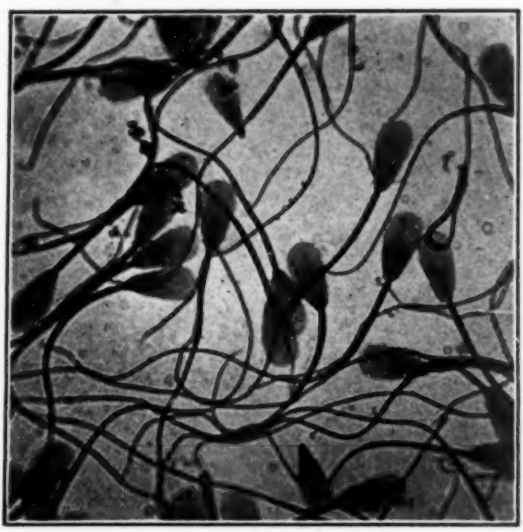


Figure 2.—Spermatozoa from Bull With Lessened Fertility, Showing Tapering, Tailless Heads.

a germinal portion of the testicles either at the time of calfhood or at any period following. The greater portion of cases of infertility in the bull are evidenced by demonstrable changes in the spermatozoa, but there are occasionally cases in which these changes can not be demonstrated, the difficulty being due either to a simple loss in vitality or directly due to an infection excreted along with the seminal fluid. The efficiency of the bull is usually dependent upon the extent of these changes. Generally, however, his actual reproductive efficiency is decreased out of all proportion to the changes observed, showing that the reduction in vitality of the cells is usually quite uniform, regardless of the fact that such would not be indicated if judged entirely from the percentage of abnormal cells present.

The following cases illustrate the results that one may in general expect following the use of a sire with weakened and diseased germinal cells:

Bull. No. 5 (Figure 3) was first put into use when a yearling in the fall of 1919. Since then he has been used about 4 to 7 times per month. It has taken about three services per conception, although he was used on cows which in general one should expect to conceive promptly. In the past five months he

Figure 3.—Abnormal Spermatozoa from Bull. (From Williams, "Diseases of the Genital Organs of Domestic Animals," 1921.)

has been almost sterile; only one or two cows have conceived during this time. On the original examination of this bull there was a very high percentage of abnormal cells. An examination made in February, 1921, shows a great increase in the number of abnormal cells, they being present now at the rate of about 300 per 1,000. An animal of this kind should not be allowed to remain in service.

When abnormal spermatozoa occur in any quantity I have failed to observe any appreciable improvement afterwards although I have had under observation for the past two years a number of such bulls with abnormal spermatozoa.

In June of last year, I examined in one herd two bulls, both of which had a very high percentage of abnormal cells. With one of them about 50 per cent of the spermatozoa had narrowed head parts, but as at that time this was considered as a nutritional disturbance in the development of the cells which might possibly be improved, he was continued temporarily in service.

Figure 4.—Chronic Catarrhal Salpingitis. The mucous folds have been destroyed and the lumen of the tube is filled with debris. Case No. 952; calved normally May 15, 1918, followed by slight pyometritis. No microscopical lesions present. Slaughtered October, 1919, on account of sterility. (From Williams, "Diseases of the Genital Organs of Domestic Animals.")

The breeding records of this herd in the following eight months have been interesting. This bull has been used 24 times. Thirteen pregnancies resulted, of which 8 have been aborted. In contrast to this are the records of two other bulls used in the same herd. Nineteen pregnancies have resulted from the use of these two bulls, and to date there has been no recognized abortion from any of the cows served by them.

Bull No. 4 was used in a large herd for about four years. All of the spermatozoa delivered were abnormal at the time of each of the various examinations. This bull has recently died, but for over a year prior to his death all of the spermatozoa were nonmotile when delivered. His use in the herd, where he was the chief herd sire, was evidently responsible for the major portion of the loss of reproduction. Briefly the losses from the females with which he was used are as follows:

	1916	1917	1918	1919
Abortions observed (per cent)	25.0	21.9	27.0	40.0
Total losses, aborters and sterile cows (per cent)	40.0	30.6	80.7	89.5

There is very good evidence with some bulls that the impotence is due to a simple lessened vitality of the germinal cells and not to an infection or any changes that might be the result of an infection; but whatever the cause may be, it is quite possible that the potency (the strength of the germinal cells in so far as the transmission individual characteristics is concerned) of the bull may also be affected. Many high-bred bulls have weak germinal cells, and I would naturally assume that, although they may be competent to impregnate a limited number of females, the strength of the germinal cells might be insufficient to carry along strongly the blood lines of the sire. Impotency is common to bulls of all ages, and where we see it most frequently is in the younger animals where the weakness is discovered soon after they are put to use.

The union of the male and female elements occurs in the vicinity of the ovary very soon after the ovisac has ruptured. Only one spermatozoon unites with the egg, although over 50,000 are probably eliminated at one service. The spermatozoon penetrates the wall of the ovum, fuses with it, and then a series of cell divisions commence, resulting eventually in the production of the fetus. After fertilization the ovum passes through the oviduct into the uterus, where it becomes imbedded in the uterine wall and obtains nourishment. Here it commences to grow. At

first the connection is directly with the uterine wall, but the fetal membranes soon develop, surrounding the fetus in a sac and suspending it in fluid. The fetal nutriment is now obtained through the circulation of this membranous attachment.

It is to be remembered that all through the microscopic phase in the process of reproduction numerous obstacles to life may occur; in fact, the death of the ovum and of the almost microscopic embryo is probably a great deal more common than later when it is more developed and thus more resistant to factors which may cause its death. A slight infection may ostensibly cause the death of the fertilized egg before it can become implanted in the uterus, and apparently only a slight inflammation or infection of the uterine apices may prevent implantation, although this same infection might be insufficient to cause the death and expulsion of the fetus after its attachments are once firmly established. The cause of the premature expulsion of the fetus is usually an interruption of the placental circulation. There is really nothing essentially abnormal in the expulsion of the fetal cadaver. Indeed it is quite normal that the dead fetus should be extruded from the uterus, but it is not normal that its death should occur.

If we are to control and better the reproduction of cattle, we must be interested primarily in all factors which may cause the premature death of the germinal cells or embryo. If an abortion occurs in the latter part of pregnancy when the placentary attachments are firmly established, the infection usually causes a swelling, and an impingment of the villi of the fetal cotyledons and retained placenta results. When the cow is cleaned these attachments are loosened and an increased area for the absorption of toxins and bacteria into the system is produced. In most of the cases there is a marked lack of contraction of the uterine muscles, which still further increases the uterine absorption. We thus see a high mortality in many herds following the removal of retained placentas. During the acute stage, as in human medicine, it will many times be much better to allow the afterbirth to be retained rather than risk the reaction commonly following its removal.

From the clinical standpoint we should not attach any great mystery to the presence of infection in the genital organs, as is done by many, especially those who believe that we are dealing with a specific infectious disease caused by *Bacillus abortus*.

These men have been put to a great deal of trouble to establish the mode of infection, because there has been so far no evidence made available showing that the genital organs of either the cow or bull may commonly be infected by *B. abortus*. It has merely been shown that a limited number of observed abortions are associated with this organism at the actual time of the abortion. The practitioner will find that he is more interested in eliminating those bacteria which are constant inhabitants of the genital tract and are thus capable of causing the death of the embryo at any period of its existence. He must recognize that decreased reproduction, abortion and sterility commonly occur in connection with various diseases or inflammations in the genital tract, and if he is to increase the reproductiveness of the cattle he must first disagnose such disease of the organs as may be present. Any one who has worked with non-reproductive cattle realizes that the surgical treatment of the diseased organs gives the best prospects for recovery and that a correct diagnosis gives the best foundation for adequate prophylaxis.

Clinically we can define only two venereal diseases of cattle. First, the vesicular venereal disease, which is very uncommon in this country but occurs occasionally in some European countries. Second, the granular venereal disease, which is scattered throughout the United States and the world. Its significance in so far as reproductive efficiency is concerned is not clearly understood. We de recognize, however, that in those instances where this disease is very severe the reproductive efficiency is noticeably lessened. In the female it usually makes its appearance during the first few months of life as small granules in the walls of the vulva. A slight purulent discharge ensues, causing a matting together of the hairs of the vulvar tuft. This may not occur if the calf is fed upon pasteurized milk from the start.

So far as we know, there is no infection which is pathogenic for one sex only, and I think that in the case of any venereal disease we are not justified in believing that the bacterial cause of the disease may affect only the female of that species. The evidence of granular venereal disease of the bull is quite common and has been especially so in a number which we have had killed on account of disease emanating from them. With one bull which had a very servere case of granular venereal disease of the glans penis the breeding efficiency was very poor and the progeny that were delivered were poor, weak individuals. He was

eliminated from service, slaughtered, and replaced by a young bull, whose efficiency was high and remained so for about six months, when he too became diseased and had to be slaughtered. The autopsy of this second bull showed a streptococcic infection of the seminal vesicles. Several other bulls have been eliminated from this herd on account of disease, and I have little doubt that the bacterial cause has been the same in each instance. At any rate, the disastrous effects upon the herd were quite identical.

Granular venereal disease in the bull is first observed when but a calf, the prepucial hairs becoming matted together as the result of the discharge from the prepuce and sheath.

Inflammation of the testicles or epididymes although not diagnosed in a great many cases, is apparently not very uncommon. A chronic inflammation of the fine tubules of the epididymis occasionally results in a tumefaction of this organ. With the excretory passage from the testicle closed, an atrophy of the testicular tissue often ensues. Accompanying this disease there is often an inflammation of the seminal vesicles. The normal function of these organs is very important, because their secretions form the major part of the seminal fluid and because they undoubtedly secrete some material which has an influence upon the activation of the spermatozoa. Slight disease of the seminal vesicles is quite sufficient for the production of sterility, even without the involvement of the testicle, and it usually renders the bull very dangerous from the standpoint of the dissemination of infection through the herd. There is probably no more important organ of the male with regard to genital disease than the seminal vesicles, because they are perhaps the most frequently infected, and with the infection once established it must necessarily be discharged at the time of every coitus.

The genital tract of the cow is subject to a great diversity of disease, and I can only touch the surface of this subject as I have done with relation to the germinal cells and the bull. To appreciate the problems involved in reproduction one must consider not only the individual role played by each part of the tract but understand how they are interrelated in their functions.

The greatest obstacle to their correct functioning is the various infections which may become centered at any point of the genital tube. The cervix of all parts is the most exposed to infection, and a slight inflammation or infection of it may alter the secre-

tions from its wall or otherwise impede the progress of the spermatozoa through the cervical canal. The normal cervix has a number of folds and furrows, admirably adapted for the lodgment of infection, especially so if the cervix once becomes infected and swollen. It is significant that in about 30 per cent of all cows with diseased genital organs the cervix is involved. Usually the cervix may be considered the primary seat of infection. The folds become enlarged, inflamed, and often so indurated that it may be very difficult to pass an instrument through the cervical canal. Many practitioners have been led to believe that the cervix was closed so that the spermatozoa could not gain entrance. As a matter of fact a mechanical or physical closure is very rare. The progress of the spermatozoa is impeded by the inflammation and functional disturbance of the mucous membrance lining its canal. It is a functional closure, and the mere dilatation of the canal without adequate disinfection serves no useful purpose. In many cases, especially those which have been running for some time, the infection becomes lodged so deeply in the mucous folds that it can not be reached by antiseptics, and anything short of purely surgical technique is of no avail.

After the cow becomes pregnant a thick mucus should be secreted by the glands of the cervix. This plugs up the cervical canal and hermetically seals the uterine cavity. If it fails to form, the uterine cavity may be invaded readily by infection, and the fetus, being unable to withstand it, is aborted. The lodging of an infection in the cervical canal must be considered as one of the primary factors in the infection of the uterine cavity and the ultimate death of the fetus.

Although the uterus is probably the most frequently diseased organ of the genital tract, the changes in it which result in a permanent disability of the cow as a breeding unit are not as common as in the case of disease of the cervix, the oviducts or the ovaries. The uterine disease in a large number of cases is dependent for its continuance upon a permanent seat of infection lodged either in the cervix or oviducts. A discharge issuing from these parts may readly gain entrance to the uterus, and although we find that the uterus is practially free from infection in many cases, as a rule it can not remain so if the strain upon the cow is increased by the state of pregnancy.

An inflammation of the oviducts constitutes the most insidious

type of genital disease with which one has to deal. The infection is usually streptococcic. It gains entrance to the tube and becomes lodged in the fine folds of tubal mucosæ, where it maintains a more or less permanent footing. Here it may prevent the passage of the spermatozoa and the fertilized egg either by means of altering the character of the secretion or by an actual destruction of the cells lining the oviduct. In a certain percentage the tube becomes closed and cystic, but this is not the rule, the bulk of tubal sterility occuring without any evidence of an actual physical closure of the oviduct. Even if the infection does not prevent the passage of the germinal cells and impregnation results, there persists the constant danger of bacteria invading the uterus from the chronically diseased tube and causing the death of the fetus at a later period. It is in those herds especially where we observe a great deal of cervical and tubal trouble that the abortion and sterility rate continues high from year to year, and only by preventing or overcoming this infection can the reproductive efficiency of the herd be increased.

My records show that about 15 per cent of infertility in cows is associated with disease of the oviducts. The percentage would be considerably higher if those cases with micropathological changes could be taken into consideration. In most cases of tubal disease the only recognizable change consists in a slight adhesion of the fimbriated extremity of the tube to the ovary. This is easily recognized on clinical examination after a little practice.

What I have tried to outline are the factors which in general are responsible for lessening the reproduction of cattle. As far as we know, we are not dealing with a specific infectious disease. It is more of the nature of wound infection. The types of bacteria present vary considerably.

I see no reason, in our present state of knowledge, for trying to assume that the mode of infection is materially different from that of venereal infections in man. With the young animal, before it has reached sexual maturity, we must consider a hematogenous origin; but as the animal matures, becomes more resistant and its sexual life commences, infection from sexual contact or otherwise directly into the genital tract is undoubtedly the predominating method. Perhaps the main reason why there has been so much controversy on the mode of infection which may cause a cow to abort is the fact that most investigations have

been fragmentary. The bull has not been considered as a source, evidently on the hypothesis that because a bull can not abort he can not be diseased or infected by some organism which may infect a cow and destroy the fetus or germinal cells. Undoubtedly infection of the male organs by *B. abortus* is very uncommon; at least there is little record of it; but that does not mean that the organs of the bull may not be infected by other bacteria which render him very dangerous for use in a herd.

The predominating factors in lessening reproduction are (1) infection and (2) a weakness of the germinal cells. It has been my experience that sterility and abortion in general are either accompanied by visible lesions in the genital organs of the cattle or in that particular outbreak are intimately associated with disease of the germinal cells of the bull.

If we are to make real progress in the control of genital diseases we must keep ourselves in a receptive mood and not be confined to any one phase of this broad subject. Our efforts should not be centered upon one part of the genital tract nor towards any one organism that may inhabit it. We should aim to control any factor that interferes at any point of the reproductive scheme.

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BIOLOGICAL PRODUCTS

By W. C. BURKHART

Associate Professor of Veterinary Medicine, University of Georgia, Athens, Georgia

AT the present ime when so many different biological products are being employed and recommended in our daily practice it seems necessary that we of the veterinary profession should familiarize ourselves with the subject of serum and vaccine therapy. At present and in the past these products have been used in both human and veterinary medicine without much regard for their theoretical value or the basis upon which they have been developed. Although I feel safe in saying that the veterinary physicians as a whole use these products as intelligently as the human physician, nevertheless there is yet much to learn and to be worked out in regard to their uses by both professions.

The subject of serum and vaccine therapy can hardly be found in the curricula of the various veterinary colleges today, and when found it is usually in the column of electives. The Committee on Intelligence and Education of the A. V. M. A. has failed to recognize the true value and importance of serum and vaccine therapy. It is true that the subject is yet a new one, and many of the older graduates had not even the opportunity of electing a similar course of study while in school and many of the recent graduates did not take the advantage when offered.

However, from practical use of these products after graduation nearly all the veterinarians, if they have kept up with the trend of the times, have had more or less experience with these products. Sometimes these experiences are beneficial and sometimes otherwise; nevertheless they will still present themselves until we have a better foundation of the principles involved. Even though these experiences sometimes occur to the sorrow and embarrassment of all of us, and at the expense of someone else, there is a certain amount of definite information gained. However, the objection to information thus obtained is that we all do not experience the same kind of information; very often it is information of a directly opposite kind.

The older practitioners who grew up with the times had the opportunity of witnessing the many new developments of biological medication, and with perhaps some new references at hand, even though with the disadvantage of no special training in school, they are as well qualified or even better qualified to use properly products of this nature than the more recent graduate with the special training. However, the graduate of today without the special training in serum and vaccine therapy has a long and rough road before him, for very often he will locate in a community where not a little of his treatment will be of a biological nature and either he is not possessed of a speck of foundation or at most has very little knowledge of how to apply treatment of this nature. This will also apply to the older practitioners who have not taken advantage of the available literature or kept up with the development of bacteriological products.

The graduates of today without the special training, and the older practitioners who have not taken advantage of available literature of this nature, I believe I am safe in saying, number not a few; yet as you find these veterinarians in practice they have about as large a stock of biological products as of pharmaceutical products. I believe I am also safe in saying that these veterinarians use as many or more biological products than the veterinarians who have made a thorough and sincere study and followed the development of these products. This statement seems to contradict itself, since the least informed is said to use the greater number of these products. However, this is due to a number of causes. First, the veterinarian who is uninformed in regard to proper use of these products does not know the true value of them and therefore uses them for almost everything. Secondly, they are often used when contraindicated; and lastly, because the traveling salesman, who is not a veterinarian, has the number of sales at heart, rather than the good of the veterinary profession, or even of the commercial house which he represents, and, through his supposed wonderful knowledge of the products, takes advantage of the uninformed and really forces products upon the veterinarian, and he in turn must realize something from them in the way of compensation. This alone brings about a number of different and variable uses, one of which, reported by a veterinarian, is the use of a vaccine for lungworms in swine with favorable results.

After the extensive use of biological products for the past several years the opinions of the veterinarians throughout the country in regard to them are quite variable. Even though we should expect this to a certain extent, since the same condition exists in regard to pharmaceutical products, yet, because products of this nature are more specific, so much variation should not present itself. Until the veterinary profession as a whole has a better understanding of serum and vaccine therapy this variation of opinion is bound to exist.

Another factor which has a great deal to do with this diversified opinion is difficulty of making a correct diagnosis. The establishing of a positive diagnosis in practice is not always possible, due to the lack of necessary material and facilities. Even though good results follow special biological treatments, we have not sufficient evidence to warrant a positive statement in regard to the effectiveness of the biological preparation used.

Serum and vaccine therapy are to the application of biological products what pharmacy and materia medica are to the use of drugs, and if we ever expect to use serums and vaccines intelligently we must place more stress on the subjects which deal with these products specifically. In the past the different texts on therapeutics gave only a small chapter or nothing at all on biological therapeutics. The newer editions, however, contain extended articles, and it will be only a short time until a course of serum and vaccine therapy will be required in the curriculum of every modern veterinary college.

In the administration of biological products we must have general principles to follow if we expect to use these products intelligently and at the same time get the desired results. Too often both biological and pharmaceutical products are prescribed without intelligent consideration of their action or usage, consequently we get results which lead us to believe or disbelieve in a product according to the unreliable results obtained. In the rational application of these products we must base our use of them on the theory of immunity after Ehrlich. This theory is that immunity is produced by a chemical substance in the body (which corresponds to chemical stimuli outside the body), and when the chemical stimulus is injected into the body the body reacts and produces chemical protective substances, known as antibodies. These antibodies are chemical substances which have the power of neutralizing specific toxins or destroying

specific living organisms, depending entirely on the specific chemical stimuli used in their production.

Aside from Ehrlich's chemical theory we must also consider the different types of immunity which are produced by the different biological products. First is active immunity, the one which is the most desired. It is due to the introduction of organisms or their products, either alone or in connection with a specific antiserum. The organisms when used alone are alive and virulent, or alive with virulence reduced, or the organisms may be dead. The products that were made from dead organisms were once called vaccines (as were those made from the attentuated organisms), but are now known and designated by the Bureau of Animal Industry as bacterins, which is purely a commercial name. The organism or virus when used with a specific antiserum is not attentuated as much as when used as a vaccine. Ordinarily in producing active immunity we speak of the procedure as vaccinating. While this is not a satisfactory term (as the derivation of the word is not significant of the product or the procedure in applying the treatment), nevertheless it is thought best to use it on account of its generally accepted usage. (Perhaps "immunizing" would be a better term to use.) The second type of immunity is passive, and this type of immunity is not so desirable or at least not lasting. However, it is more or less used, and is produced by the introduction of blood serum only of an animal which has been super-actively immunized. This type of immunity is not always practical for the veterinarian to use, on account of the uncertainty of the immunization period.

The production of immunity in animals is purely a prophylactic treatment, and while it is not recommended as a curative treatment, it is very often so employed, sometimes to a disadvantage, at other times to an advantage, depending entirely upon the product used. The production of active immunity depends on a reaction on the part of the body to produce a good lasting type of immunity.

If an animal already has a disease, it seems as though the body has been overstimulated to such an extent that it would be impossible to get a reaction from it. Therefore it seems useless to use on animals that are already sick from an infectious disease, those products, which would produce active immunity in healthy animals. However, this practice is common. Very often vaccines and bacterins are used in cases of generalized infections

where logically an antiserum should be employed. This antiserum is always specific for the causative agent that is producing the disease, and when administered produces no reaction on the part of the body. The material is absorbed into the blood stream, and there, coming in contact with the causative agent, tends to neutralize it. If enough antiserum is used, I believe one is safe in saying that it has curative value. The difficulty is that, not knowing the amount of virulent material present, we often give too small a quantity of antiserum.

Oftentimes there is no differentiation made between biological products in regard to their use; that is, vaccines and antiserums are regarded as interchangeable. If the practitioner does not have the antiserum he uses the vaccine. However, during the last few years, due to the special efforts of those interested in biological products and the constant demand for their intelligent use on account of the prevalence of infectious diseases, the above-mentioned condition has largely been overcome.

A list comprising the different biological products used for both prophylactic and curative treatment includes vaccines, bacterins, sero-vaccines, sero-bacterins, antiserums (including antitoxins and antibacterial serum), aggressins, and bacterial filtrate.

Vaccines at one time comprised those which were made from virulent material by attenuation. The organism or virus was alive and virulent, or attenuated, reducing the virulence, or dead. Now products made from organisms which have been killed with heat are called bacterins. If the organisms are killed with an antiserum the products are sero-vaccines. If the organisms are attenuated by heat and the virus attenuated by passing through animals, the products are called vaccines.

Antiserums include antitoxins and antibacterial serums or antivirus serums. They are made by injecting an animal with repeated doses of organisms or toxins or virus and antiserums until an active immunity has been produced, and then the animal is hyperimmunized with large or subsequent doses of the virulent material. The serum of the blood of the animal so treated contains the specific antibodies.

Aggressin is a substance liberated by pathogenic bacteria which protects the invading bacteria by destroying the bactericidal substance of the host; that is, it prevents phagocytosis. The exact nature of aggressins is unknown, and while the subject of aggressins is still unsettled, there is strong evidence to show that they are endotoxins liberated by the breaking up of

the microorganisms. Aggressins can be produced naturally or artificially.

Natural aggressins are the substance found in the exudate or swellings around the site of infection. This substance is collected, clarified and sterilized, and when used it produces an anti-aggressin, a substance which neutralizes the aggressin. Just why the injection of an aggressin brings about active immunity is not thoroughly understood.

Artificial aggressins or cultural filtrates are artificial cultures of pathogens filtered free of the bacteria. Here the filtrate contains the aggressin and when used produces anti-aggressins.

While the above-mentioned list includes almost all of the different products of a biological nature used for treatment, we may have any one or several of them for a specific disease. This, of course, is necessary, as different products are essential for different stages and types of diseases.

The different types of immunity produced as the result of the application of biological products depend entirely upon the product used and the time of application. For instance, vaccines, bacterins, sero-vaccines and sero-bacterins, aggressins, virus and specific antiserum all produce active immunity and should be used on healthy individuals or localized infections. Antiserums produce passive immunity in healthy individuals, and when used in a case of generalized infection will in the majority of cases result in active immunity, providing the animal recovers.

All biologics which produce active immunity should be employed as a prophylactic treatment, while biologics which produce passive immunity may be used either as a prophylactic or a curative treatment. The passive immunity derived from the antiserums is of short duration and of not much benefit. The curative value of the antiserums will depend a great deal on the amount of serum used and the quantity of virulent material present, and as there is no way of telling the amount of virulent material present, it is necessary to use a large amount of antiserum. In many cases of infectious diseases where a lot of serum was used the results warranted the cost of the treatment.

Veterinarians with a better understanding of biological products will be able to treat more intelligently and successfully the various infectious diseases, as in only a few specific instances is chemotherapy now applied in infectious diseases, and there should be a wide application in this class of treatments.

A FEW APPLIANCES FOR THE RESTRAINT OF ANIMALS, PERFECTED DURING THIRTY YEARS IN PRACTICE [1]

By EDMOND E. BITTLES, *Waterford, Pennsylvania*

IN starting to practice as a young man I quickly found that the teaching of proper methods of restraint of animals, which should be a basic course in all veterinary schools, had been omitted in my case. There is still a great tendency in many institutions of learning to overlook much essential fundamental instruction. For example, my nephew came home from an agricultural college to spend the holiday vacation, and said to me, "Uncle, I have learned to butcher, and I expect to kill dad's fat cow." At the same time, he showed me his butcher knife, and told me the good qualities of it and the manufacturer. Upon examination, I found it to be about as dull a butcher knife as I ever handled, and said to him, "Didn't they teach you to grind and steel your knife and put it in order?" He answered with some surprise, "Why, no!" I then remarked, "You don't know how to butcher. Any fool can kill a cow if he has a sharp knife." Another illustration of this lack of training in fundamentals was a recent observation made by myself of a vocational school sending its saws to a carpenter to be filed and set. Hence my selection of this subject when called upon by the Northwestern Pennsylvania Veterinary Club to represent them at the State meeting.

HOISTING APPARATUS

The first time I was called to raise a horse I felt like the boy with the butcher-knife. With my twenty-five dollar swings and a set of pulleys in a stable with a low ceiling, I found it took about four or five men besides myself to get those swings on and pull the horse up. I decided that so much time lost in gathering in the help would never do. I therefore purchased a chain hoist with which one man could raise a ton, and made the remainder of the apparatus shown in Figure 1.

The length of the evener, or wooden portion of the device, is 30 inches from the center of one rope to the center of the other

[1] Presented at the meeting of the Pennsylvania State Veterinary Medical Association, Harrisburg, Pa., January, 1921.

rope where they pass over it. The staple in the center of the evener should be just large enough to allow the hook of the chain hoist to pass into it. Very often the ceiling is so low that space is at a premium. Be sure that the evener is just as smooth as possible at each end where the rope passes over it, so the rope will readily slip back and forth on it. The two pieces of three-quarter-inch rope are about 12 feet long, with a loop in one end of each piece.

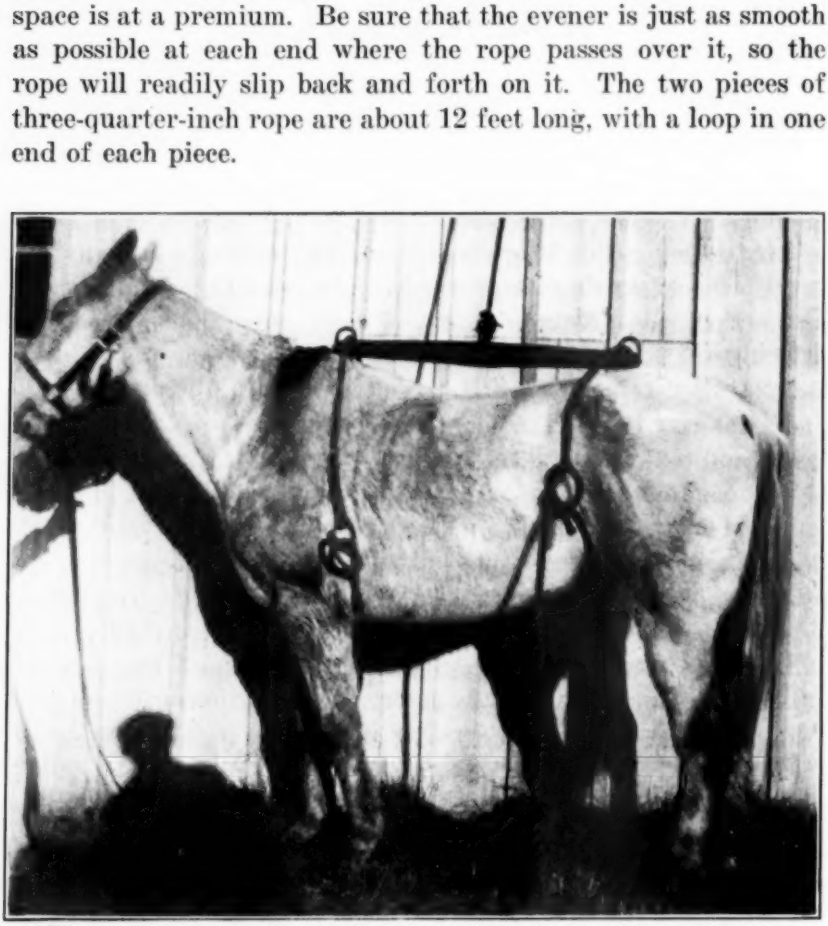


Figure 1. Horse with shawl-strap mechanism in place after he has been lifted to his feet. With this apparatus one man can raise a horse to his feet without any assistance.

Now for illustration of its use. Suppose the horse is down on the right side. To apply the apparatus, take the end of one rope, pass it through the loop at the other end, and loop it around the left hind leg below the fetlock. Pass the rope under the animal's front legs, head and neck, and pull back toward his tail until you have slid it just back of the shoulder blade. Loosen the rope from the hind foot and pull the rope under the body until the loop comes just back of the elbow on the upper side of the horse. Now pass the end of the rope

through the end of the evener and through the loop of the other end of the rope back of the elbow, drawing it around the horse as tight as possible, and tie. Take the other rope and fasten the loop around the fetlock of the left front foot, then pass the rope under the hind legs and tail and pull on the rope toward the horse's head until it comes into his flank. Loosen from the front foot and pull it under the body until the loop lies in front of the stifle on the upper side of the horse. Then pass the other end through the evener and through the loop, and be sure that the rope is pulled tight around the horse and tied.

Success depends considerably on getting the rope drawn tight around the horse, with the evener down close to his body. Be sure that the rope slips freely over the ends of the evener, as the latter will be over the ribs when the horse is lying down, and as he is raised it will slip toward the spine. This eliminates all danger of the rope slipping on the horse and burning him. Before lifting put a good halter on the horse and tie him so he can't whirl around when he gets on his feet. After the chain hoist and appliance are in place you can raise a horse in 15 minutes, as he is perfectly balanced. You can use a good strong neck yoke or singletree in an emergency for the evener. If your patient is on the street you can hitch to a tree or pole.

CASTING HARNESS

The casting harness shown in Figures 2 and 3 is used for all operations on horses and cattle requiring them to be cast. With it I have operated on close to 300 abdominal ridglings, with one fatality. My success can be largely attributed to having the horse secured in the right position.

The casting harness consists of one piece of five-eighth-inch rope 60 feet long, a back pad, a belly band, pulleys and hobbles. The center of the rope is secured to the back part of a leather pad about 8 inches square, which sets across the back of the horse where the back pad of an ordinary harness is placed. The rope made in the form of a figure 8 across the back is fastened in the front by a small clamp and can be made any size desired, and is always threaded for use. When placed on the animal for casting, buckle the belly-band and fasten the hobbles to all four feet. Now pull on the ends of the rope, which will tighten the belly-band and hold it snug to the horse. Always pull the ends of the rope in the direction of the animal's head and at the same time back the animal up.

Figure 2. Horse Cast and Tied up With Casting Harness.

Figure 3. Casting Harness on a Cow.

A MODIFIED SIDE-LINE

The modified side-line (shown in Figure 4), consists of 16 feet of three-quarter-inch rope. Make a loop in one end of the rope to loop around the hind leg below the fetlock. Take 20 inches of rope and splice both ends of it into the long rope 50 inches from the loop end, leaving an opening of 3 inches between the two ropes. When the end of the rope is passed around the horse's neck it is brought back through the 3-inch opening and

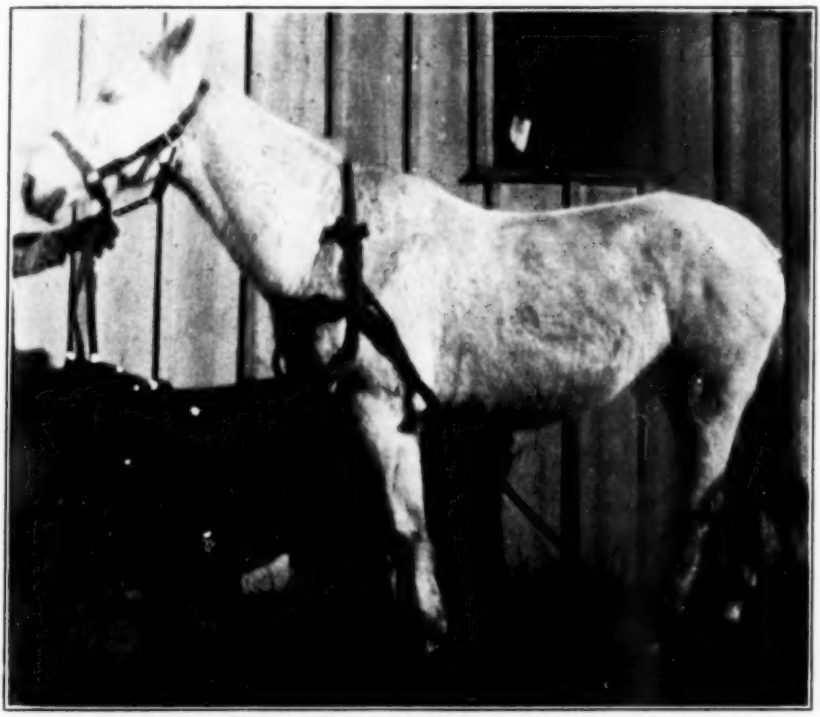


Figure 4. A Modified Side-Line.

tied. Draw the hind foot forward as far as possible so if the animal reefs ahead it won't catch the front quarter.

This line without an assistant holds the animal perfectly safe for the veterinarian to sew up a kick wound or perform any other minor operation on the hindquarters or tail. Always carry it with you. It will pull your flivver out of the mud.

RESTRAINING BOX FOR SMALL ANIMALS

The cat or dog restraining box (Figure 5), is 26 inches long, 18 inches deep and 12 inches wide, with the cover to fit the box

being 6 inches longer. A groove is cut in the sides of the box in which the cover slides easily back and forth. The ends of the box are short enough so the cover will pass over them. The cover has a wedge-shaped piece cut out of one end, about 9 inches across the end and extending back about 8 inches to a point.

In placing an animal in the box catch it by all four feet and drop its head and front feet in the box with its back close to the end of the box. Push the cover with the wedge-cut end on each

Figure 5.—A little girl sitting on the cat or dog box holding her pet cat, waiting to have a deeply embedded small piece of glass removed from one of his hind feet.

side of the flank, tight enough so the animal can neither get in nor out of the box, leaving the rear end exposed. Then the assistant sits astride the box on the cover, thus holding the latter in place, and grasps a hind leg in each hand. In his way he will hold the patient as quiet as if it were dead, and it is in an ideal position to perform castration or sew up a wound.

To operate on the nictitans membrane or perform other eye operations in a small animal, insert it in the box with the head out, being careful not to shut tight enough to cause choking. I use it in a great many ways.

THE TWITCH

To make a twitch take a hard stick of wood about 1¼ inches thick, either round or square, the latter being the easiest to

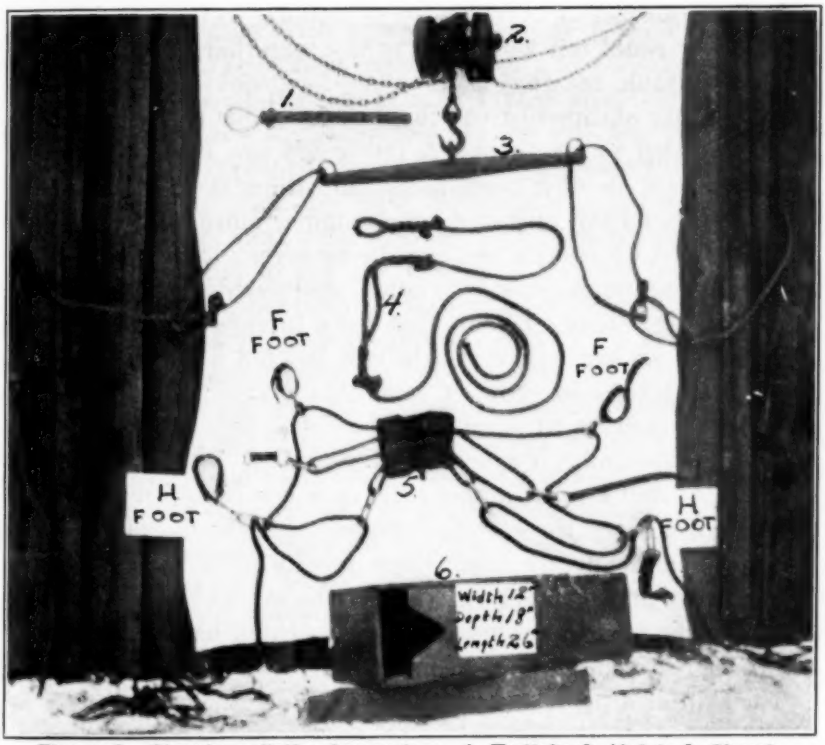


Figure 6. Showing all the Apparatus: 1, Twitch; 2, Hoist; 3, Shawl-Strap Mechanism for Hoisting; 4, Modified Side-Line; 5, Casting Harness; 6, Dog or Cat Restraining Box.

keep from turning. Bore a ⅝-inch hole in the end of the stick about 2 inches deep, then bore a ⅜-inch hole in two sides of the stick about 1 inch from the end. Take a piece of window cord and pass through the holes in the two sides and put a knot on each end of the cord. Catch cord in center with forceps and pull it through the hole in the center of the stick. A twitch made in this way is easy to twist up, and the rope lasts a long time.

TORSION OF THE UTERUS

By JOSEPH W. VAN SANT
Fox Chase, Philadelphia, Pennsylvania

AFTER about twenty years of general practice, of which a great part has been cattle practice, I have learned to like especially dystokia of cattle, although for many years I dreaded to find a torsion of the uterus to handle, because all procedures seemed to fail me. I never failed eventually to turn the uterus, but I never could tell what part of my long, hard, tedious work was accountable for the results, therefore could never get confidence in my ability to treat these cases. This being so, naturally I dreaded to get them. A few years ago I decided that I would operate on such cases, going into the abdomen just above the rumen. I have operated on a number since, and have had very satisfactory results, one case being a very large sow.

I first examine my case by vagina, and decide just what kind of a condition exists. I know that these torsions exist sometimes days before we are called. If the cow has not been feeding well for a few days, and shows a somewhat empty stomach, I will proceed to operate at once. If, however, the rumen is quite full, and especially if the cow is very fat, I may order her starved out and given Glauber salts in one-half to three-quarters pound doses every three or four hours until she has cleaned out very well, and operate after these results have been obtained. While operating, I leave the cow in the stanchion with a nose leader in the nose if needed, but the stanchion has been the only means of restraint in most of my cases.

The skin at a point just back of and above the point where we would puncture the rumen is shaved or clipped and washed. An incision is made in the skin downward and forward about 4 inches long, or large enough to admit one's arm. I then use the index finger to separate the muscles in the direction of their fibers, using the knife if I have any trouble in pushing my finger through into the abdomen. I then introduce my hand and arm, which of course have been washed very well and may be rubbed with carbolized vasoline, and examine the position of the calf and the condition of the uterine walls.

I have had only one case that could not be replaced in less than five minutes, and have replaced a complete turn in less than one minute after examining position of uterus and calf, as it

just rolled over like a ball. We must use much care not to push the fingers through the uterus, working with the flat of the hand and against the calf at a point where a hollow gives us a ledge to work on.

If the uterine walls are swollen and the uterus seems like a round ball, and we can not outline the calf well, we must use great care not to rupture it. This may be somewhat difficult to turn, on account of the hand slipping over the smooth surface of the uterus. In this condition you may get considerable help from two assistants with a strong piece of wood 6 feet or so long and from 2 to 4 inches wide.

We will say that the left horn is turned over the right horn and has come back to its position on the left side again. This horn, to be put in its proper place must be pushed down, across and brought up over the right horn again. We may push it down and across very well, but when we then try to reach over the gravid uterus to get the left horn we can not reach far enough to get the hand under it to raise it up, and we can not hold what we have already gained because we have only one hand to work with. Now we have pushed the horn down and across as far as we can; stand one assistant on each side of the cow, holding an end of the board—standard of hay rack or whatever we have—holding it under the cow's stomach. The man on the left side of the cow, who is on the same side as the operator, will raise his end of the stick and use good pressure against the cow's stomach; then he will lower this end and the man on the right side of the cow will raise his end, remembering to keep good, strong pressure against the stomach at all times. This will assist you very much to get your hand under the uterus and also in helping to rotate it up over into its place again. Now that we have it back in place, the wound is sutured with two or three stitches of catgut, taking the peritoneum and muscles, then suturing the skin with five or six stitches, using any material you want.

You may take the calf at once, or if the walls are thickened, due to impaired circulation, we may let this condition readjust itself somewhat and give time for the os uteri to dilate better, waiting for a day or so, until such time you think best. If the walls are thickened they are very easily ruptured by the traction that we may use in taking the calf. If the calf is taken at once, I have a man hold a clean, damp cloth over the incision to keep air from going into or out of the abdomen.

CUTEREBRA LARVAE FROM CATS, WITH A LIST OF THOSE RECORDED FROM OTHER HOSTS

By MAURICE C. HALL

Senior Zoologist, Bureau of Animal Industry, Washington, D. C.

A dipterous larva from the neck of a cat in Washington, D. C., and one from the nostrils of a cat in Nashville, Tennessee, were recently received on the same day by the Zoological Division of the Bureau of Animal Industry. They proved to be larvæ belonging to the genus *Cuterebra* Clark, 1815, in the broad sense of that term and disregarding such later genera as *Rogenhofera* Brauer, 1863, *Bogeria* Austen, 1895, and *Atrypoderma* Townsend, 1919. At the present time our knowledge of the larvæ belonging to the various species of *Cuterebra* which have been described as adults is too scanty to warrant much in the way of specific determinations of larvæ. There is especially little known in regard to early larval stages.

Of the two specimens sent in, the one from Nashville was apparently in the final larval stage, being 1.35 cm. long in a contracted condition, black and densely covered with spines; the spines have broad bases of variable shape. The other specimen, from a cat at Washington, D. C., was in an earlier stage, being 6.4 mm. long in a contracted condition, white and with small black spines along the anterior and posterior margins of the segments, the middle portion of the segments being devoid of spines.

A casual examination of the available literature discloses what appear to be similar cases of *Cuterebra* in the cat in this country in seven instances, and from the cat in Canada (Hadwen, 1915) in one instance. Four of these cases are reported in *Insect Life*, volume 6. On page 266 of number 3 of that volume there is a report from North Carolina. The grub is described as oval, an inch or seven-tenths of an inch long, and covered with small black excresences. The correspondent states that the parasite was on the belly of the cat and states that he has been told of a case where it was in the eyelid. The Division of Entomology regards the case as one of infestation with *Cuterebra*, but the specimen was not sent in.

On page 327 of number 4 of the volume referred to, there is a report of larvæ removed from the side of the eye and from

the back of a cat in Columbia County, N. Y., and a report of a bot three-fourths of an inch long from the neck of a kitten at St. Louis. These specimens were not sent in to the Division of Entomology, and while the grubs were almost certainly *Cuterebra* in at least one case, and probably in all, they were not seen by an entomologist. Other cases of infestation in cats, the grubs being in the neck and causing death, have been reported from Iowa by Miss Sharp in a paper by Osborn (1892). Washburn (1905) reports bots, probably *Cuterebra,* from under the jaws of kittens. Britton (1921) reports the receipt of a large *Cuterebra* larva from the side of a six-months-old kitten at Vernon, Connecticut.

The writer's two cases make it seem exceedingly likely that *Cuterebra* has been found in the cat in over nine cases in the United States. Presumably it has been found oftener, and it may be that the cat is fairly often infested with *Cuterebra,* though it is evidently not the usual host. Hadwen (1915) has suggested that cats might become infested by eating an infested rodent.

The larval forms of various species of *Cuterebra* occur in a rather wide range of hosts, specimens having been reported as follows:

Cuterebra cuniculi from hares and rabbits in the United States (Georgia, Florida, Arizona, Colorado, Iowa and California), according to Osborn (1896).

Cuterebra emasculator from *Tamias lysteri, Sciurus carolinensis leucotis, S. hudsonicus* and unnamed squirrels and chipmunks in the United States (New York, Arkansas, Massachusetts and Iowa) by Fitch (1859) and by Osborn (1896); from the dog in Canada (Montreal) by French (1893). These are largely regarded as *C. emasculator* because of the situation of the larvæ in the scrotum.

Cuterebra spp. from *Thomomys borealis* in the United States (Wyoming) by Leidy (1857); from *Lepus palustris* and *Sciurus aureogaster* in Mexico by Coquerel and Salle (1862); from *Sciurus aestuans* and *Didelphys philander* in Brazil by Natterer (1820 and 1821) [Bau (1906) lists *Rogenhofera grandis* from *Sciurus aestuans, Didelphys philander* and *Hesperomys flavescens,* the species being reported from Argentina, Brazil and Patagonia]; from *Cervus rufus* and *Didelphus murina,* apparently in Europe, as listed by Bau (1906); from *Citellus*

tridecemlineatus pallidus and *Neotoma fallax* (*?*) in the United States (Colorado) by Hall (1910); from field mice in Canada by Hadwen (1915).

Cuterebra spp. from *Lepus* sp. (Texas and unnamed localities), *Lepus texianus* (California), *Sylvilagus mallurus* (Maryland), "rabbit" (Connecticut), *Tamias striatus* (locality not given), *Neotoma cinerea orolestes* (Colorado) and *Mus decumanus* (Florida), specimens of which are in the Helminthological Collections of the U. S. Bureau of Animal Industry, in addition to specimens of which records have been previously published.

Cuterebra fontinella from *Lepus artemisia* in the United States, according to Bau's (1906) list.

Cuterebra funebris from *Loncheres guianae* in Trinidad, according to Bau's (1906) list.

Cuterebra lepivora from cotton-tail rabbits in the United States (Wyoming and California) by Coquillet (1898).

Cuterebra grisea from gopher in United States (Minnesota) by Washburn (1905).

Cuterebra lepusculi from *Lepus artemisia* in the United States (New Mexico), by Townsend (1897).

Bogeria princeps may have its larval stage in *Lepus callotis* in Mexico, according to Townsend (1897). He says: "*Bogeria princeps*, I have little doubt, infests the jack rabbit (*Lepus callotis* Wagler) in Sonora." However, this assumption requires confirmation.

Rogenhofera grandis from *Hesperomys flavescens, Sciurus aestuans* and *Didelphys philander* in South America (Brazil, Argentina and Patagonia), according to Bau's list.

Bogeria sp., perhaps *B. princeps*, from *Lepus callotis* in the United States (New Mexico) by Townsend (1892, 1897).

Cuterebra tenebrosa from *Neotoma cinerea, Onychomys leucogaster missouriensis* and *Cynomys ludovicianus* in the United States (Montana) by Parker and Wells (1919).

Bogeria scudderi from rabbits [probably including *Sylvilagus mallurus* as the host for Washington, D. C., and Beltsville, Md.] and from swine (2 cases) in the United States (District of Columbia, Maryland, Virginia, Tennessee and Texas) by Townsend (1917).

Bogeria princeps from jack rabbit and cottontail in the United States (Arizona, New Mexico, California and Nevada) by Town-

send (1917). According to Townsend, *Cuterebra lepusculi, C. lepivora* and *C. albifrons* are synonyms of this.

Bogeria emasculator from squirrels and chipmunks in the United States (confined apparently to the northeastern part of North America), according to Townsend (1917). He lists *C. scutellaris* as a synonym.

Bogeria fasciata from *Tamias* sp. in the United States (New Mexico) by Townsend (1917). This species shares with *B. emasculator* the habit of developing in the scrotum as a larva.

Bogeria fontinella from rabbits in the United States (South Carolina, Florida and Mississippi) according to Townsend (1917). He states that it is "evidently confined to rabbits." Hadwen (1915) notes that adults of this fly have been collected on Savary Island, where no rabbits exist.

Bogeria buccata from rabbits in the United States, according to Townsend (1917). He states of *B. fontinella* that it approaches *B. buccata* and is "like it, evidently confined to rabbits." Washburn (1905) reports *B. buccata* from *Neotoma* sp. in Minnesota.

In the Cuterebrinae, there were, in 1917, 3 genera, *Cuterebra, Bogeria* and *Rogenhofera.* The adult flies are separated by Townsend (1917) in his key as follows:

1. Arista nude.....*Rogenhofera*
   Arista with hairs on upper side and on apical part of lower side.....2
2. Antennal pit extended below in a tapering prolongation, the peristomalia converging obliquely and meeting near the lower end of carina.....*Cuterebra*
   Antennal pit circumscribed below, subcircular, the peristomalia parallel and closely approximated to carina for about the lower half of its length.. .....*Bogeria*

The larval characters are not well studied for the various species in these genera and a key compiled at the present time is apt to prove misleading and inadequate.

Of these 3 genera, *Rogenhofera* occurs in South America and is not known to occur in North America. The North American species belong to *Cuterebra* and *Bogeria.* Townsend (1917) lists the following as valid species of these 2 genera: *Cuterebra cuniculi, C. analis, C. approximata, C. histrio, C. americana, C. tenebrosa, C. atrox, and C. maculosa; Bogeria emasculator, B. grisea, B. buccata, B. fontinella, B. princeps, B. fasciata* and *B. scudderi.*

The first stage larva of *Cuterebra americana* has recently been described by Ferris (1920). This is the type species of the genus *Atrypoderma* Townsend, 1919, and the only included species at present. The generic characters of the adult fly are given as follows: Mesoscutum at most scarcely as long as wide. Abdomen no wider than thorax. Front not prominently produced, the front border of head viewed from above subarcuate. Antennal axis little over half head height. Whole outline of head and body viewed from above equilateral and subquadrangular.

The egg of *Cuterebra fontinella* (*Bogeria fontinella*) has been described by Hadwen (1915).

VALUE OF ANIMAL EXPERIMENTS TO HUMAN SURGERY

In *The Country Gentleman* of February 12, 1921, is a most interesting article on vivisection from the pen of Dr. W. W. Keen, Emeritus Professor of Surgery, Jefferson Medical College. He states that in every operation upon his fellow creatures since 1876, he has been guided by the results of experimental research. "Research has given to surgeons, physicians, and obstetricians new operations and new means of treatment wholly impossible of attainment by any other method and these have been blest of God to millions of our suffering fellowmen, as well as to animals. These researches have changed the surgery of desperation before 1876 into today's surgery of assurance."

HOGS REQUIRE INCREASED VETERINARY SERVICE

Twenty or thirty years ago more than 80 per cent of the cases to which veterinarians were called consisted of horses. Today the horse represents only about 10 per cent, as shown by case and hospital records of four of our large State colleges. For convenience, I have placed the animals in the order of numbers treated. Swine, 7,335; cattle, 6,023; dogs, 5,041; sheep, 2,707; horses, 2,688; fowls, 2,564; cats, 1,779; rabbits, 73; squirrels, 4; canaries, 3; ferrets, 2; camels, 1; deer, 1; goats, 1, guinea pigs, 1; leopards, 1; monkeys, 1; parrots, 1; pigeons, 1; skunks, 1. Of the 28,227 cases treated, only 9½ per cent were horses.—L. ENOS DAY.

THE POSITION THAT VETERINARY SCIENCE OCCUPIES WITH RELATION TO ANIMAL INDUSTRY [1]

By ALONZO S. SHEALY

College of Veterinary Science, University of the Philippines, Los Banos, Philippine Islands

IF my source of information is correct, our profession had its birth in a horseshoeing shop. Men who shod horses naturally came in close contact with ailing animals, particularly lameness. It is natural to suppose that these men were eager to relieve the dumb beasts with which they came in contact; and notwithstanding the fact that these men were uneducated, in many cases were even unable to read and write, they were the ones who were looked upon for advice and guidance when anything was found abnormal with the locomotory apparatus of the horse. Often they were able to render assistance by the application of the art of blacksmithing. They could wield the hammer and shape shoes and trim feet in such a manner as properly to balance a horse, thereby accelerating and improving the gait. This was done by the application of the art of wielding the hammer properly and the art of trimming the foot, without any knowledge of the science of the anatomy of the horse's foot or the functions of the different parts which compose it. Even to this day there are many arts in the science of veterinary medicine, viz., the art of applying the knife in veterinary surgery and the art of administering medicine, not to mention again the art of horseshoeing, all of which are of great assistance and value to the veterinarian.

Referring back to the birth of our profession, at that time horses received most consideration, and the horseshoers, who were our first veterinarians, were the logical men whom owners relied upon when anything became abnormal with the horse. As time advanced these early veterinarians did not confine their activities to the horse's feet. They acquired knowledge of certain drugs, usually through the advice of some practitioner of human medicine, and these they administered, but usually confined themselves to the mildest purgatives. These were given without knowledge of the anatomy of the digestive tract or

[1] Presented at the Ninth Annual Convention of the Philippine Veterinary Medical Association.

of any of the physiological changes which take place therein. All the knowledge required for the practice of veterinary medicine was obtained under the most easy circumstances, and no doubt in many cases was imparted when the individual was performing his usual vocation of nailing shoes on horses' feet.

Nothwithstanding the fact that very little effort was required in order to obtain sufficient knowledge to practice the profession of veterinary medicine, few seemed to enter the field. This, no doubt, was due to the fact that as a prerequisite the individual had first to perfect himself in the art of horseshoeing.

This condition of affairs continued until other species of livestock—cattle, sheep, goats, swine, poultry and pet stock—were developed and improved. These animals with the horse formed the livestock industry of the world. As they were developed, increasing their valuation, their owners, with the law-makers of the different parts of the world, realizing the economic importance which animals play in civilization, demanded that men, in order to be able to administer for the ailments of livestock, should be educated. Educated not only in the basic sciences upon which the great structure of agriculture is built as a preliminary foundation, but must thoroughly inform themselves in the different sciences, viz., anatomy, veterinary medicine, physiology, pathology, bacteriology, etc., these combinations forming, not more than twenty-five years ago, what was considered as covering the entire field of veterinary science.

As a result of these demands large funds were made available for the purpose of erecting colleges and equipping laboratories in order to be able to teach men to become capable of filling the great demands for scientists who really knew how to care for and minister to animals when they became ill. Of the countries of the world, probably the United States took the lead.

In a recent publication from one of the prominent veterinarians of the United States he makes the following statement: "A diagnosis is based on a careful observation of the symptoms or evidence of disease. This is quite difficult in farm animals, and unless we are acquainted with their behaviors and habits and possess a knowledge of the normal functions and appearances of the different organs of the body, we can not expect to be able to properly recognize disease." To me, this message is a revelation coming from one of our own ranks which implies that we must become better acquainted with the environments per-

taining to livestock. We as veterinarians are constantly being looked upon as sources of authority on questions of feeds and feeding and breeds and breeding, and in order to maintain our prestige we can not retire behind the statement that we are not animal husbandmen but only veterinarians. The questions of hygiene and preventive medicine are being forced upon the veterinarians more today by livestock owners than ever in the past, and it is imperative that we be equal to the demands. As we are so closely associated with the livestock interests of a country, our presence in a community should be so essential to the livestock owners that they can not afford to get along without us, as it is a fact that the only excuse for the existence of our profession is a well-developed animal industry.

At the present time some of the great institutions in America have realized the great interrelations of veterinary science with animal industry, and have regulated their curricula so that animal husbandry students are enabled to take a degree in veterinary medicine by only two years' additional work after they have completed their regular animal husbandry course of four years, and vice versa. To my mind this is a happy combination, and the only change that I would suggest as an improvement is that the entire six years of study be required before either degree is conferred, and then one which would carry both qualifications.

In the Philppines animal industry is not organized, and its development is not in accordance with the standards of other activities of agriculture in the country. We have no cattle associations, no horse associations, no swine or carabao associations. There was an attempt at forming a poultry association, but by some means its prominence has not asserted itself as it should.

I have stated that the only excuse for the existence of a veterinary profession is a well-developed animal industry. This statement, connected with the fact that animal industry is not organized and its development is not what it should be in these Islands, does not mean that the profession has no place in this development and organization. Statistics show that more than 6,000,000 pesos' worth of animals died of disease during the year 1919. In addition to this, more than 4,000,000 pesos' worth is reported as having died of other causes, one-half of which can be safely estimated as having died of disease also, the other half representing those dying from old age, floods, typhoons, etc. This

would indicate that at least 8,000,000 pesos' worth of animals—and these estimates are far below the present market prices—die annually from the result of disease. As veterinarians we are held accountable for this loss. Are we able to cope with this situation and prevent this enormous loss under our present organizations and systems which are in use? If we are not to blame under present conditions, then to me it appears, to use the good old American expression, that it is "up to us" to advocate a change, one that we ourselves can take part in, demonstrating the fact that men who compose this Association have the proper initiative to obtain results. Otherwise I honestly believe that the proper thing for us to do is to retire from the field and wait till the animal industry of these Islands has developed to an extent which will demand our services.

Personally I see no cause for even thinking of getting out of the field. I believe in taking up the work as we find it and doing whatever is necessary to do. By this procedure some day it may be possible to realize what to me will be a bright day for the Philippines, viz., in each province there will be a well-organized animal industry association and at the head of this association will be the veterinarian who is a good animal husbandman.

WORDS, WORDS, WORDS

Every business man has wondered some time or other in his life where his lawyer friends get all their words, most of them useless and superfluous. The difference in speech between the ordinary human being and a legal luminary is illustrated quite forcibly in this little story. If a man were to give another an orange he would simply say: "I give you this orange." But when the translation is entrusted to a lawyer to put in writing he adopts this form: "I hereby give and convey to you, all and singular my estate and interests, right, title, claim and advantages of and in said orange, together with its rind, juice, pulp and pits, and all rights and advantages therein, with full power to bite, cut, and suck and otherwise eat the same or give the same away with or without the rind, skin, juice, pulp or pits, anything hereinbefore or hereinafter or in any other deed or deeds, instrument or instruments of whatever nature or kind whatsoever to the contrary in any wise notwithstanding."—*The P. G. Gazette.*

THE CARE AND TREATMENT OF HORSES AND CATTLE[1]

By ISADORE BLUM, *Philadelphia, Pennsylvania*

HORSES have been the friends and companions of man for ages. Generations and generations ago, Job showed his admiration for horses, and so, now in the Bible we can read his famous writing about horses. Coming down the ages we listen to Buffon, the great historian of horses, and he in his turn draws, in a few phrases, a splendid portrait of a horse. Descending still later, we arrive at our time-honored age, the twentieth century, and we ask ourselves the question: "Are we treating these animals, which are even written of in the Bible, with justice?" In the following paragraphs I will endeavor to treat this subject of horses, and try to find the answer to the preceding question.

The horse is one of the most intelligent of animals. His senses of hearing and smell are strong, his sight is excellent, and he can see by night better than man. He has a very strong memory and easily finds a road which he has traveled over once. He knows his master well, and is attached to him. He is also attached to cats, and many cases have been known of the horse pining slowly away after the death of this favorite friend, or the opposite is also known.

Horses respond to intelligent care and treatment. There is a saying that a good grooming is worth a quart of oats any day. The horse should be kept in a well-bedded stall, which should be cleaned out every day and fresh straw put in again. The stable should be clean, well lighted and properly ventilated. If he can be blanketed he will have a better appearing coat; a light blanket will keep off the flies and add to his comfort.

A horse will do its work willingly and cheerfully, if treated rightly. Infliction of pain on a horse is a barbarous act, and yet, even in this stage of civilization, we see it done. All because the driver is in some dejected mood, and having nothing but the horse before him he wreaks his vengeance on him. All

[1] This paper, written by a ten-year-old boy, a pupil of the F. E. Willard Public School of Philadelphia, was awarded the first prize of $25 offered by the Pennsylvania Society for the Prevention of Cruelty to Animals for the best essay on the care of animals. The young author read it before the Philadelphia Veterinary Club, March 29, 1921. It is published as written, with practically no editing. Considering the youth of the author and the fact that he is a resident of a crowded city where automobiles are numerous and horses much fewer than formerly, it is remarkable that he should have acquired the knowledge regarding horses which this paper indicates him to possess. Evidently it is possible for a boy to grow up in a big city and still have an interest in animals.—Editor.

for nothing the horse receives this brutal treatment, yet he stands it, as only a horse can.

While "breaking" a colt, his confidence should be aroused. Bad treatment while "breaking" has led to the ferocity of horses as they grow older, as can easily be seen by anyone who has read "Black Beauty" in the case of "Ginger." A horse will bite and kick when alarmed, but if the master and horse understand each other there will be no such happening.

The rations of horses are limited in all countries practically to hay, cereals and grains. The kind of food varies accordingly to the locality. In Eastern United States timothy, hay and oats make up a favorite ration; further west, corn with clover and alfalfa hay; on the Pacific slope, rolled barley is used with hay from the wild oat and barley plants; in the South, corn is the chief grain feed, also the leaves of the corn plant are dried and used for food. In other countries rye and other cereals find favor. The following rations may be suggested for a draft horse weighing 1,500 pounds. Sixteen pounds of mixed hay, timothy and clover, and 16 pounds of mixed corn and oats ground together. If the horse is at light work, the grain should be cut down and the hay increased.

For driving horses, timothy, hay and oats are the favorite rations. Oil meal, the residue from flaxseed in the manufacture of linseed oil, is a desirable food. This meal fed at the rate of one pound a day helps to keep the animal's coat smooth and the body in good working order.

A horse should be watered before feeding. He may drink when warm if good care is taken. Let him have a swallow of water, then stop him from drinking. Repeat this operation until his thirst has been quenched.

The danger in watering a horse when he is hot is that a large quantity of water striking his stomach at one time chills it, or partially paralyzes it, resulting in acute trouble. A horse should have a chance to drink every five hours.

Many accouterments worn by the horse are not in the least necessary. One of them, and a very grievous one to the horse, is the check-rein. Nature never intended a horse to hold his head so high. Although the check-rein may be used to stop the horse from stumbling, yet it doesn't have to be drawn back so that the horse wishes he should in some way be put out of his misery, rather than endure it any longer. Nature never in-

tended it, but still man uses it. Why? Because it looks pretty. If we just call to mind the little proverb, "Do to others as you would have them do to you," we can then, a little, understand the predicament the horse is in because of this check-rein.

Then there are the blinkers, and because of these the horse can only see what's directly ahead of him. Many an accident could have been avoided if the horse would have had full use of his eyes. Fire-horses are given full use of these members, because horse authorities know that blinkers impede the speed of horses and sometimes cause serious accidents.

A sharp bit should never be used. It cuts the horse's mouth, which often remains sore for days.

While working with draft horses, care should be taken to see to the collar. It should be fully padded, for, if not, the skin will be rubbed off, causing the horse much pain, and making him unfit for work until it is entirely healed.

Another cruelty formerly practiced on animals, but not so frequently now, is that of cutting the tail off short. You can see the state the horse is in, for he has no protection against his relentless foe, the fly. It is an unnecessary practice and is used only for style, with saddle and racing horses.

We will now leave this subject and talk on the subject of the overloading of horses. As I think of this a scene flashes across my mind which I will relate in the following paragraph.

It was a hot day, during my summer vacation. I was sitting on the step, when before me slowly passed a wagon filled to its capacity. A miserable hallucination of a horse was striving with what seemed to be supernatural power to pull the wagon. His nostrils expanded, his head low, his chest heaving, foaming at the mouth, sweating from every pore, and his legs wearily plodding along, exerting his utmost strength. He stops, for he can no longer endure it. A gesticulation, accompanied by a curse, a whistling through the air, a sharp report, and the horse moved on again. I awoke from the stupor I had fallen into on seeing such an unearthly sight. Though the wagon was far down the street, yet I could plainly discern a deep furrow on the horse's flank, where the whip had bitten deep into the flesh. Such is the vivid picture impressed on my mind, and I pity that horse when I recall it, even now, for his is an unhappy lot.

So, many horses find an early grave, through the cruelty of their masters, which should not be so.

We are now practically through with horses and so the subject of cows will come next.

The same bedding, as that of horses, holds good for cows.

They should be let out to the pasture every day, except in winter. If there is no brook in the pasture they should be brought home and watered three times a day. Do not chase them while bringing them home. They should be cleaned before they are milked. Although the cow may be sick, she should still be milked, but the milk should not be used. The cow should be milked early in the morning and later in the evening. Milk should never be left in the cow from one day to the next, for she's liable to get sick. Her diet should consist of pasture in the summer. Corn, hay flavored with molasses, bran, rock salt and corn fodder in winter.

We have now finished all, except the answer to the question in the first paragraph, and we will draw our own conclusions as to the correct answer. Taking it as a whole the horse is treated fairly well by some people. (I am not mentioning the cow because she is used for household purposes mostly, while the horse does all the work, and therefore receives the treatment.) But some people still have the idea that a horse is a dumb brute and should be treated as such, which is entirely wrong. Yet I hope these few will soon be converted and the horse will be seen in his true and fitting character.

"The Future of the Horse of Heavy Draft" is the title of an article in the *Breeder's Gazette* for May 5, by Ellis McFarland, Secretary of the Percheron Society of America, who states that changing farming conditions and the spring business of a pedigree registry association indicate the resumption of draft stock production.

Among the arrivals at the animal quarantine station at Athenia, N. J., during May was a Belgian sheep dog belonging to Georges Carpentier, the French pugilist. The dog passed inspection and was released to go to his master's training farm.

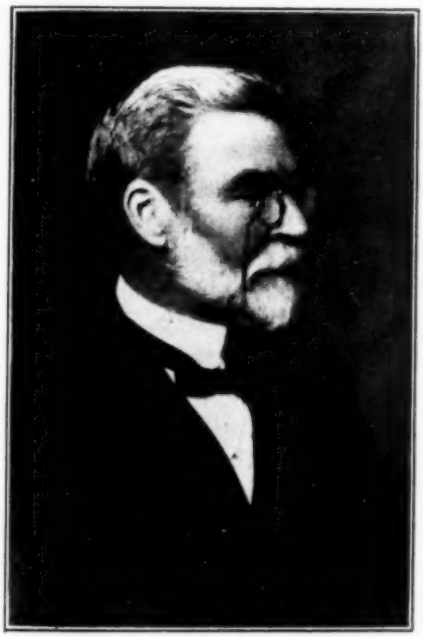
"The action of a number of the larger State fairs and stock shows in providing regulations to prevent the spread of tuberculosis among cattle exhibited at their shows is to be highly commended."—*Hoard's Dairyman.*

A TRIBUTE TO DR. JAMES LAW

By V. A. Moore

Dean New York State Veterinary College at Cornell University, Ithaca, N. Y.

THE history of veterinary education in America is recorded in the biographies of a few distinguished leaders. The evolution of the veterinary practitioner from the untrained and illiterate enthusiast to the well educated, technically trained and legally licensed veterinarian of today is the product of the efforts of a few veterinarians who came to this country from Europe in the sixth decade of the nineteenth century. They all became connected with veterinary colleges. Some of them established schools that were supported by the fees of students and consequently were restricted to teaching, largely on a commercial basis. Two of them came to great universities that were in the making under the Morrill Act. One of these, together with his pupils, brought forth the veterinary college at Ohio State University. Dr. Law came directly to Cornell as professor of veterinary medicine and surgery. He and his pupils founded the New York State Veterinary College at Cornell University, the Federal Bureau of Animal Industry and the first State livestock sanitary board. Always a leader, he often formed public opinion and guided public action in many critical periods.



Dr. Law was a life-long advocate of a preliminary and professional training for veterinarians that would render them the peers of the medical profession. It was through his influence that a four-year high-school course was required by statute for

entrance to the college he founded and also for admission to the veterinary licensing examination of the State. He believed in adequate preparation for veterinary students and likewise their protection after graduation, to the end that competent veterinary service might safeguard the livestock interests of the State. He was sent to represent the United States at the International Veterinary Congress in Brussels in 1883. While in Europe he collected data on the requirements for graduation in thirty-three veterinary colleges on the Continent. The report he made on those institutions and his notable address, ten years later, before the New York State Agricultural Society on "The Importance of a Higher Veterinary Education" are the two strongest arguments in our literature for a better veterinary profession.

Dr. Law a prominent writer on animal diseases and their control. He contributed many papers to veterinary societies and journals and also to agricultural papers and public health associations. In order to assist animal owners at a time when there were few, if any, veterinarians in the country, he wrote a very helpful book entitled "The Farmers' Veterinary Adviser," which passed through sixteen editions. He is the author of a comprehensive system of "Veterinary Medicine" in five volumes which is in its third edition. Before coming to America he prepared, in cooperation with Dr. John Gamgee, the principal of the school where he taught, a well illustrated book on "The Anatomy of the Domestic Animals" which is still held in admiration for its clearness, conciseness and accuracy. In addition to his writings, he was always ready to give any assistance he could to advance his profession.

The opinion of Dr. Law on all veterinary subjects was sought for and held in high esteem not only by animal owners and veterinary practitioners but also by State and Federal officials. For many years he was the leader in livestock sanitary work in the United States. The service he rendered to the Government in the investigation of swine diseases, in the eradication of foot-and-mouth disease in the earlier outbreaks, and in exterminating contagious pleuro-pneumonia were of incalculable value. His early experience in Scotland with foot-and-mouth disease had caused him to believe that the radical method employed by the United States Government for its elimination was not necessary. Although scientific in his habit of thought, he was a conservative. He was in full accord with the Bureau of Animal

Industry in its method of eliminating contagious pleuro-pneumonia. More than this, his firm stand on its extermination saved the Nation untold millions. His experiments in the use of heated cultures of bacteria, the first of their kind in America, have been overlooked by many writers on that subject.

Dr. Law was educated in the veterinary and medical schools of Edinburgh, Scotland, a student of William Turner, the great anatomist, and Joseph Lister, the father of antiseptic surgery. He studied also in the veterinary colleges of Lyons and Alfort, France. He prepared himself thoroughly for his life's work.

Dr. Law was an inspiring and thorough teacher. In his earlier years at Cornell he was not only a teacher of unusual distinction but also the leading comparative anatomist and pathologist; the most skilled in veterinary surgery; the keenest in physical diagnosis; and the most scientific and successful livestock sanitarian in America. It was at his feet as students that Daniel Elmer Salmon and Leonard Pearson received their inspiration for the valuable work they accomplished. Occasionally in those earlier years, with a prophetic vision, he would refer to the coming of veterinary colleges that would be worthy of the cause they were to serve. Although the ideal which he wished to be attained is still a long way in the distance, he laid the foundation and centered the attention of veterinary teachers on the goal. This was a large task for one man to perform. And now the mantle of this great scholar and teacher has fallen on the veterinary educators of the land. No one of them is capable of wearing it alone. It must be borne by them all as a united body, dedicated to the task of securing the best possible preparation for coming veterinarians.

Dr. Law was born February 13, 1838, in Edinburgh, Scotland. In 1860 he became professor of veterinary anatomy, physiology and materia medica at the New Veterinary College of Edinburg and its continuation in London as the Albert Veterinary College, where he remained until 1867. In 1863 he married Miss Elizabeth Creighton of Kirkcaldy. They were blessed with one son and three daughters. The son died at the age of 30.

Dr. Law came to Cornell University as professor of veterinary medicine and surgery in 1868 at the solicitation of the Hon. Andrew D. White. He held this position as head of the veterinary department until the opening of the New York State Veterinary College in 1896, when he was made its director, which

position he held until 1908, when he retired as emeritus professor. He lived the remaining years of his life on the campus.

Dr. Law was a gentleman in every sense of the word. He was of a retiring disposition, a thorough student, and positive in his convictions. His purpose in life was the advancement of a cause, not self. He detected the great truths of the science of medicine, yea, he has helped to bring many of them to light and, like Pasteur, he recognized the great horizons beyond the facts. Again he may be compared to the great French savant in that the magnitude and munificence of his work have ever stood in the front, shadowing the man. He was active in civic and university matters and a Baptist in his church affiliation. Dr Law was a man to whom the inscription above the entrance to Pasteur's tomb might justly be applied: "Happy the man who bears within him a divinity, an ideal of beauty, and who obeys it; an ideal of art, an ideal of science, an ideal of country, an ideal of the virtues of the Gospel."

After a brief illness, Dr. Law died May 10, 1921, ripe in years and blessed for his many good works.

UNUSUAL CASE OF RABIES

The Veterinary Record quotes the following from the London *Daily Telegraph:*

A remarkable case of death from hydrophobia has occurred at the Pasteur Institute, Paris. Madame Bisseler, of Dutch nationality, has died nine months after having been attacked by a dog afflicted with hydrophobia. During this period 25 antirabic injections had been made, and the medical explanation of her death is that she was one of those humans, happily rare—for at the Pasteur Institute only two cases of rabies out of a thousand are fatal—upon whom the treatment does not avert a fatal termination. The bite was particularly serious. Ordinary bites, when they are not treated, prove fatal within a month, and those on the face at the end of 25 days. The experts at the Pasteur Institute have not yet found the reasons which make the treatment of some human beings, as with certain animals, rabbits in particular, ineffective. The causes are mysterious, and are at present being inquired into. It is satisfactory to know that hydrophobia is on the decline (in France). There are now only 70 cases under treatment, whereas during the war the number was 160. The question of increase or decrease is a matter of administration, and the view of the Pasteur Institute is that the muzzle for dogs gives the best results.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

AN OBSCURE CASE IN A BULL

By A. H. BRYAN, *Baltimore, Md.*

An extremely interesting case came to my notice recently which may prove interesting to the profession. A valuable Holstein purebred bull, aged 4 years, came to the notice of the local practitioner a year or so previously with a history of losing weight despite a liberal well-balanced ration. There was no evidence of diarrhea or constipation, nor any observable gastro-intestinal symptoms. Malnutrition was suspected, with poor assimilation of feed. Carlsbad salts and stomachics were prescribed. The bull failed to respond to the treatment, and the loss of weight and a gradual progressive emaciation continued. No other abnormalities could be found despite the most careful physical examination. The veterinarian had excellent grounds, however, for suspicion of tuberculosis, based on the chronic emaciation. The bull was tested by the intradermic method and failed to react. Treatment for helminthiasis followed without success. The digestive tract was proved to be normal in every respect. Later cerebral anemia was evidenced by the paleness of the conjuntival and buccal mucous membranes.

The bull by this time showed every evidence of unthriftiness, dullness and depression, yet there was no visible falling off of feed. Temperature and respiration were slightly above normal, pulse 90, and slightly wiry. No abnormal swellings or nasal discharge was evidenced. Generalized tuberculosis was suspected, and possibly extensiveness may have accounted for last failure to react. There was also a history of tuberculosis in the herd, so the Federal veterinary inspector was sent for to test the bull by the subcutaneous test. As considerable success had been obtained by the use of very large doses of tuberculin in suspected generalized cases, 100 c. c. of tuberculin was used. The result was negative.

Later cerebral symptoms became manifest, with nystagmus, slight bilateral strabismus, further emaciation and evidence of

stupor. There was a little evidence of sensitiveness about the head on percussion.

The next time the case came to my notice the owner had decided to slaughter the animal because no successful treatment had been outlined. This time both temperature and pulse were high; the animal was very emaciated, and at times lapsed into prolonged unconsciousness. We were now sure the condition was of a cerebral nature, and happening to get hold of the left horn stump noticed that it was loose. By exerting extreme pressure on the horn stump the skin was ruptured and pus exuded. By restraining the animal in the recumbent position we were able to excise the horn stump and pull it out from the base. Pus literally poured out, and by drainage and siphoning from the horn base and frontal sinus over a quart of pus was drawn out. We next curetted out the frontal sinus and washed out the cavity. Needless to say immediate recovery followed. In a comparatively short time the bull was back in normal condition.

No postmortem report is forthcoming, the bull being alive and doing splendidly. But it is evident that this pus accumulation in the frontal sinus caused a suppurative periostitis of the bony plate forming the base of the frontal sinus and the roof of the cranial cavity, and subsequently a bulging of the internal bone plate. This downward bulging caused a pressure on the cerebral hemispheres, which accounted for the cerebral symptoms which developed later.

The case in itself is not extraordinary, as probably many veterinarians have successfully treated similar cases. However, the complete masking of any diagnostic symptoms until the case had progressed to the extent it did, the lack of nasal or conjunctival discharge, the absence of extreme sensitiveness about the head, no head shaking, and just this gradual progressive emaciation, from a standpoint of symptomatology might be considered atypical.

We had advised the owner, and he readily agreed, to slaughter the bull, due to failure to make a diagnosis and suspecting some internal, hidden disease of a chronic insidious nature. Fortunately the accidental palpation of the horn stump revealed a very clear-cut diagnosable condition. The case may serve as a warning and a further proof of the necessity for thorough physi-

cal examination, resorting to every avenue of diagnosis before condemning a case no matter how perplexing and atypical the condition may appear.

A PUZZLING CASE IN A MARE

By A. J. NEAL, *Bangor, Maine*

I was called last June to attend a mare 11 years old, said to have shown symptoms of colic while being driven into town and later back home, a distance of about 3 miles each way. This mare had always been outwardly healthy, had never been bred, and had been used only as a lady's harness horse. The only known chance for injury was when the mare backed a light carriage over the edge of a stable wharfing and fell about 8 feet, striking on her right side. This accident happened about 10 months prior to my being called to this case, so probably had no influence upon it.

When I arrived at the stable I was told that she had gotten over the period of apparent distress manifested by pawing, changing position of hind feet and pointing to the left side with her nose. I was also told that it was next to impossible to get the animal to move faster than a walk while hitched to the carriage.

After quite a thorough examination I could find no signs of digestive disturbance, so I advised a light laxative diet and went back to town.

Two days later I was called to the same patient with the same history except that the symptoms were more pronoumced than before. The mare had been driven to town very slowly and seemed to be all right, but on the way home developed such colicky symptoms that it was with difficulty that she was gotten into the stable. She evidenced severe pain upon being moved, but was quite at ease while standing.

Upon my arrival I made a thorough examination for digestive derangement, and finding no symptoms except a slightly accelerated pulse, I decided upon a rectal examination.

In inserted my right arm, and as it passed into the region of the left ovary it came into contact with an abnormal mass which was approximately 5 by 4 by 2½ inches and was really quite a handful.

My first thought was that this was an enlarged ovary due to some pathologic condition. The mare showed intense suffering when the mass was manipulated, it evidently being very sensitive. It was of about the consistency of kidney, although somewhat less firm and roughly oval in shape. The right ovary was apparently normal.

I told the owner what I had found and told him that about the only chance I saw to improve her condition was to spay her. I left the mare then with the understanding that she should be kept under observation for a week to see if there was any change for the better, and if not I was to spay her.

The owner harnessed her on the third day after I was there and drove her about slowly during which time she showed no sign of pain. After that she was driven as usual and for the next four months she showed no sign of a recurrence of the condition.

STATISTICS OF RABIES DIAGNOSIS

In a little over ten years, from February 1, 1909, to April 30, 1919, the Hygienic Laboratory of the United States Public Health Service examined for diagnosis for rabies 1,003 animal specimens, with positive results in 588 cases and negative results in 415, according to a published compilation by H. E. Hasseltine in *Public Health Reports*. Of 389 specimens submitted to both microscopical and animal inoculation tests, the microscopic finding was confirmed in 91.3 per cent of the cases. Of 406 specimens inoculated into animals there were 79 positive results, the average inoculation period being 16.2 days. The colder months of the year furnished the greatest number of specimens and the greatest percentage of positive findings.

For purposes of comparison we have examined the published reports of the Bureau of Animal Industry for the ten years from 1911 to 1920, inclusive. During this period the Bureau examined specimens from 1,400 animals and made a positive diagnosis of rabies in 837 of these cases. It will be seen that the proportion of positive cases is about the same in both sets of figures.

ABSTRACTS

DIPHTHERIA BACILLI IN THE HORSE. Captain F. C. Minett. Jour. Compar. Path. and Ther., vol. 33, part 4, pp. 267-293.

The author succeeded in isolating from 11 horses and one mule certain bacteria which proved to be identical with human diphtheria bacilli. The animals, with the exception of 2, presented on the limbs lesions which were similar to those of ulcerative lymphangitis. These two exceptions showed, respectively, cutaneous lesions resembling acne and suppuration of the nasal sinus in which treatment by trephining proved unsuccessful. Of the 12 strains that were isolated, 5 proved to be toxic, while the remainder gave no indication of toxicity.

RESEARCHES REGARDING EPIZOOTIC ABORTION OF CATTLE. Sir John M'Fadyean. Jour. Compar. Path. and Ther., vol. 34, (1921), part 1, pp. 48-64.

The author has carried on investigations regarding contagious abortion during the last ten years and was especially concerned with the possibilities of quickly eradicating the disease. As a result of this work the following conclusions have been drawn:

1. In a herd in which epizootic abortion had been in existence for at least nine years, and which comprised 109 cows, eighteen heifers in calf or recently calved, and twenty-nine younger heifers, the disease was eradicated within a period of one year from the date of the first general test.

2. The first general test of the herd had a positive result in twenty-nine cases, and in at least twenty of these the agglutination titre of the serum indicated present infection (as opposed to recovery).

3. The test was positive in every animal that had a history of abortion, and it was negative in all the heifers which had not yet been served.

4. At the time of the first test the agglutination titre, when considered in connection with the known date of abortion, indicated a long persistence of the disease in a large proportion of the cases, and this was confirmed by repeated serum tests in several of the infected cows during their subsequent isolation.

5. In fourteen cows out of a total of sixteen that, when heifers, had been inoculated subcutaneously with live bacilli in 1911, recovery at the date of the first general test in 1914 was indicated by an entirely negative result or a very low agglutination titre, but in the remaining two the agglutination titre indicated persisting disease.

6. Agglutination tests of calves out of infected cows invariably had a positive result when made soon after birth, but a negative result or a greatly reduced titre when repeated from six months to a year afterwards.

TREATMENT OF DIARRHEA OF CALVES. M. J. Darnaurd. Revue Vet., 1920, vol. 72, no. 12, p. 743.

The author reports very good results from the use of the following treatment: In 4 tablespoonfuls of water add 3 or 4 drops of tincture of iodine (10%) and mix with this a small quantity of flour. Give this 5 times a day per os, making up the dose fresh for each administration. A number of rather severe cases of scours were treated, and in all cases there was a rapid recovery. L. T. GILTNER.

FRENCH RESEARCH ON GAS GANGRENE. E. Sacquepee. The Lancet, London, vol. 2 (1920), no. 12, French Sup., pp. 605, 606. (Abst. in Exp. Sta. Rec., vol. 44, p. 373.)

This paper describes briefly pathogenic and therapeutic studies of gas gangrene made in France during the European war. The three organisms considered by the author to be most frequently associated with gas gangrene are *Bacillus perfringens, Vibrion septique,* and *B. bellonensis* (possibly identical with *B. edematiens*). The preparation of specific serums is outlined, and the results are reported of their use as both curative and preventive agents. Of 191 cases of gangrene treated with active serums against the three organisms there were 166 cures and 25 deaths, or a mortality of 13.09 per cent, against an average mortality of 75 per cent in untreated cases in the same region. Of 319 cases of severe wounds treated preventively, only 4 cases of gas gangrene occurred.

THE DIAGNOSIS OF BACTERIOLOGICAL TYPES OF GAS GANGRENE. De Lavergne. The Lancet, London, vol. 2 (1920), no. 12, French Sup., pp. 607, 608. (Abst. in Exp. Sta. Rec., vol. 44, pp. 373, 374.)

The author describes the use of specific serums as a rapid method of determining which of the three organisms mentioned in the above paper are involved in a given case of gas gangrene. The method consists briefly in inoculating a series of three guinea pigs simultaneously with an emulsion of fragments of the wound and one of the three specific serums. A fourth animal is inoculated with the emulsion alone, and a fifth with the emulsion and a mixture of the three serums. Diagnosis is said to be fairly clear after 12 hours and positive after 24 hours. In case of infection with a single organism two animals survive, the one receiving a single serum and the one receiving the mixed serum. With a mixed infection of two of the organisms, the animal protected by the three serums alone remains unharmed, while the animals receiving the one or the other of the two organisms involved will show important local lesions.

In the rare cases in which all the animals succumb the conclusion is drawn that the gangrene is due to some organism other than *Bacillus perfringens, B. bellonensis,* or *Vibrion septique.* In the practice of the author about 60 per cent of the cases examined have proved to be due to one of these three organisms, about 35 per cent to double infection, and 4 or 5 per cent to other causes. This method of diagnosis is said to give results which parallel those obtained by the usual bacteriological methods, and to have the advantage of being much more rapid of execution.

IMMUNIZATION AGAINST CONTAGIOUS ABORTION. Investigations Conducted by the Imperial Bureau of Health, Berlin. Zwick, Zeller, Krage and Gminder. Arb. aus dem Reichgesundheitsamte, vol. 52 (1920), no. 3, pp. 375-467. (Abst. by S. C. J. Bennett in Vet. Record, no. 7, Feb. 12, 1921, pp. 144,145.)

Bang's discovery of the bacillus of contagious abortion (1897) opened up a great field for immunization experiments, and the fact that aborted cows seemed to become immune gave encouragement to investigators.

Bang himself tried to produce immunity with the bacilli, both living and dead. His final conclusions were that living organisms would produce a much stronger immunity, although even dead organisms were useful to some small degree.

These views were confirmed by the English Contagious Abortion Committee (1906). The best results were obtained when non-pregnant cows were inoculated with living bacilli and were then left some months before they were sent to the bull. In these circumstances even the most determined efforts to cause abortion by feeding the pregnant cows with abortion bacilli failed.

Serum treatment to produce passive immunity was first tried by Nielsen, but the results were not encouraging. Similarly serum followed by live bacilli had given very equivocal information.

The object of the researches published in this article has been to investigate thoroughly all conceivable methods of immunization and to find the method which will be of most practical use.

Eighty infected herds, with a total of 3,006 cows, were treated, and the following immunizing agents were employed:

(1) *Living organisms.*—Used only for non-pregnant cows, some of which had previously aborted and some which had not.
(2) *Dead organisms.*—Used for already pregnant cows and for some not pregnant. Two doses were given with an interval of 4—8 weeks.
(3) *Living organisms + Anti-serum.*—Used for pregnant cows to obtain active immunity without causing abortion.
(4) *Dead organisms + Anti-serum.*—Also for pregnant cows.
(5) *Attenuated Culture.*—(Living organisms heated at 50° C. for 2½ hours.) Used in the case of calves and yearling heifers.
(6) *Immune Serum.*—Used for infected cows in an advanced stage of pregnancy to try to prevent abortion.
(7) *Plain Broth.*—Employed as a control.

In all cases the materials were injected subcutaneously, and of the 3,006 cows observed, about 50 per cent were only given plain broth; in fact, half the cows in each herd were not treated. Thus the experimenters had an ample number of untreated animals in each herd with which to compare the treated ones. Any external factors could therefore not influence the value of the observed results of the inoculations.

Details of the results in each herd individually show widely varying results; in some herds abortion disappeared, in some

there was a decrease, in others there seemed to be no change either way, while in a few there was an actual increase.

A comprehensive view of the whole field, however, gives a much clearer impression.

Of the 3,006 cows under consideration 758 aborted before treatment and 442 after treatment. These figures include abortions in the 1,300 odd control cows also, which were not treated with any vaccine or serum. Of the inoculated cows 177 only aborted.

As a result of all the methods taken together over a wide field there was a net decrease in abortion.

Of all the methods treatment with living organisms gave the best results. Among the cows given living organisms alone there was subsequent abortion in only 5.8 per cent., and of those given living organisms and serum only 5.26 per cent aborted. Of those given dead culture alone or with serum 12 per cent aborted. Of those given serum alone 53 per cent aborted. This high percentage of abortions following serum treatment is to be considered alongside the fact that all 17 cows so treated were in an advanced stage of pregnancy and probably also of infection.

The conclusions as to the value of the individual methods are as follows:

(1) *Dead organisms.*—Both in non-pregnant and pregnant cows, some degree of immunity is produced; it is, however, of low degree and of short duration. For example, many cows did not abort at the first calving after this method of treatment, but did so at the second.

(2) *Dead organisms + Serum.*—Similar conclusions to those of dead organisms alone.

(3) *Living organisms.*—Better results in all circumstances than with dead organisms. Of 128 cows so treated which had previously aborted, and were therefore definitely infected, only 6 aborted afterwards.

Better results were also obtained in preventing abortion in cows which had not previously aborted, but were in-contacts.

(4) *Living organisms + Serum.* In the case of non-pregnant cows the results were as for living organisms alone. This method was also proved useful for the prevention of abortion in pregnant cows; in fact, this method caused as great a reduction in abortion among pregnant cows as did living organisms alone among the non-pregnant ones.

(5) *Controls (Plain Broth).*—Among the animals not inoculated there was an *increase* in the number of abortions from 175 to 245.

The recommendations as to the methods to be used are that living organisms are indicated in the case of non-pregnant cows, and living organisms + serum in the case of pregnant cows. (For one dose a week-old growth from two agar tubes emulsified in normal saline was used. The dose of serum was 100 c.c.) Dead cultures, alone or with serum, are of little use, and serum alone is practically useless.

Attenuated cultures, as given to immature animals, are worthy of but little consideration. The calves and yearlings so treated had not attained a sufficient degree of sexual maturity to be reliable subjects for the experiments.

The accompanying table and diagram show the aggregate results very clearly.

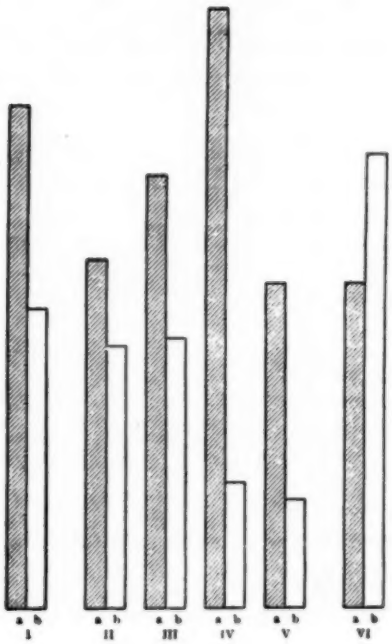
Immunizing Material employed	Abortion before treatment %	Abortion after treatment %	Increase or Decrease
Dead organisms, 2 doses, with 4—8 weeks' interval	18.51	13.20	D. 164—117
Dead organisms + Serum	21.76	13.60	D. 32—20
Living organisms, 1 dose	29.09	6 36	D. 128—28
Living organisms + Serum	16.36	5.45	D. 9—3
Controls (Plain Broth)	16.21	22.68	I. 175—245

Apart from the direct results obtained by the various methods of inoculation, the article deals with many other associated points of considerable interest.

It is shown that age has no bearing either on susceptibility to the disease or to immunization, provided always that the animals are of sexual maturity.

The most common time for abortion is shown to be the seventh month of pregnancy, with the eighth and sixth months next in order. This is in confirmation of previous statements by other investigators.

Pregnancy, it is observed, plays an important part in the



I. *a* Total abortions before inoculation.
b Total abortions after inoculation.
II. *a* Number of abortions before inoculation with dead organisms.
b Number of abortions after inoculation with dead organisms.
III. *a* Number of abortions before inoculation with dead organisms + serum.
b Number of abortions after inoculation with dead organisms + serum.
IV. *a* Number of abortions before inoculation with living organisms.
b Number of abortions after inoculation with living organisms.
V. *a* Number of abortions before inoculation with living organisms + serum.
b Number of abortions after inoculation with living organisms + serum.
VI. *a* Abortion in control animals before inoculations.
b Abortion in control animals after inoculations.

production of immunity. It is assumed that the cells of the uterus and placenta are in large part responsible for the manufacture of immune bodies. Moreover, continuous natural infection will produce immunity; it is well known that although a cow may abort once or twice, a third abortion is rare, and a fourth exceptional.

"Carriers" as a continuous source of infection are also considered. It was found that the milk of a cow which had aborted might contain abortion bacilli after a lapse of three years.

Moreover, it was shown that calves fed on this milk would probably not acquire immunity; they were in fact much more liable to be ordinarily infected, so that they might subsequently abort.

The danger in this direction from cows immunized with living organisms has not yet been definitely ascertained. Bang originally considered that the danger would be small if a period of two months elapsed between inoculation and service by the bull, and the results of these experiments tend to confirm that view.

The duration of immunity conferred by inoculation has apparently not been decided by these investigations. The only certain way of keeping down abortion in an infected herd, if the affected cows cannot be kept rigidly separated, is to practice repeated inoculations over a period of years, the pregnant cows receiving living organisms + serum and the non-pregnant ones living organisms alone.

Sequelæ of contagious abortion seem to be favorably influenced by inoculation; certainly cases of retained placenta diminish as well as cases of abortion.

Scour, which causes such great mortality among calves in infected herds, is benefited by injection of anti-abortion serum. Of 76 calves so treated in these experiments only three died of scour, and all these proved to be due to causes other than *B. abortus*.

A general view of all the foregoing inoculations demonstrates the extreme safety of inoculation; practically no untoward results were observed. An important precaution, however, is to take care that non-pregnant cows inoculated with living organisms do not go to the bull for at least two months.

GLANDERS AFFECTING LIONS AND TIGERS. Jacob Reiff. Inaugural dissertation, Giezsen, 1919.

As a result of a careful examination, the diagnosis of skin and nasal glanders was established in four instances in lions and tigers. Lions appeared to be most susceptible to the disease, tigers next, and bears least of all. Bears do not infect themselves with cadaverous meat which frequently infect lions and tigers. In the cases cited by Reiff, the disease as observed by himself and others appeared to be acute. The disease originated

through food infection and later spread from animal to animal. In the large beasts of prey, glanders may appear located in all organs as occurs in the other species of animals. The diagnosis of glanders in all beasts of prey appears to offer some difficulty, for the reason that we are not aware of the possibility of the presence of the disease, and should the disease remain undetected, it would prove to be a source of grave danger to man and animals. The pecuniary losses which might result to Zoological Gardens and menageries are very great. For instance, in two instances which came to the author's notice the loss of the whole collection of beasts of prey occurred. J. P. O'LEARY.

THE PREVENTION AND TREATMENT OF FOOT-AND-MOUTH DISEASE BY THE SERUM OR THE BLOOD OF RECOVERED ANIMALS. Charles Lebailly. Comptes Rendus, Academie des Sciences (Paris) vol. 171, no. 12 (Sept. 20, 1920), p. 555.

The efficacy of experimental anti-aphahous serum in the treatment of foot-and-mouth disease has been known for a long timer (Loeffler, Roux, Nocard, Vallee). If the method is not widespread that is because of the difficulty of preparing in sufficient quantity a serum sufficiently active. The serums obtained laboriously by hyperimunizing animals with the aid of virus of the vesicles or blood must be used in large dose. Their activity is not much superior to that of the serum of recovered animals. It is this latter serum which has been used in the bacteriological laboratory at Calvados, with the collaboration of M. Bertin, departmental veterinarian, and several of his colleagues.

Preparation of the serum.—Each collection comprised the bleeding of five animals ten days after recovery, the animals being chosen from those which were most severely affected. Each animal furnished from 3 to 6 liters of blood. The serums are collected and mixed, then distributed into bottles graduated from 100 c.c. These operations are made aseptically; as a precaution 1 gram of carbolic acid per 800 c.c. of serum is added. The employment of this method necessitates cooperation on the part of the breeders, who generally are very willing to furnish the blood of their animals. This process requires the proximity of a bacteriological laboratory.

Preparation of the blood.—For greater convenience we usually

substitute whole blood for serum; it gives identical results and may be used by any veterinarian without outside aid. The graduated bottles are nearly filled with 5 per cent carbolic acid solution, corked, and laid down. This is for the purpose of assuring disinfection without special laboratory equipment. The contact should last at least two hours. Before the collection of the blood the bottle is emptied of its antiseptic contents and the following solution is put in it: Water 50 c.c., sodium chlorid 5 grams, citrate of soda 5 grams, carbolic acid 1 gram. The blood is drawn with a trocar, no cannula being necessary. When the bottle has received 800 c.c., the blood and the citrate solution are carefully mixed by agitation. The blood remains perfectly liquid and may be employed within 48 hours. Whether of blood or serum, the injection is made with the cannula used for artificial serum, furnished with a needle of large caliber. The apparatus itself may be disinfected by immersion in 5 per cent carbolic acid solution.

Results.—We shall make no distinction between the results given by the blood and those obtained with the serum. We have treated more than 500 animals, almost exclusively bovines. These tests have required the use of 190 liters of serum or blood. In the prevention of foot-and-mouth disease we have noted the same results as our predecessors; the immunity obtained in most cases has been of very brief duration. A certain number of animals have contracted the disease by natural contagion after 15 days. Other animals, but never milk cows, have remained in the infected quarters until the extinction of the outbreak and have remained immune. Calves receive the greatest benefit from the treatment, provided always that they are not fed on infective milk. The doses have been from 200 c.c. for adults to 100 c.c. for young animals, the subcutaneous inoculation being repeated at the end of 8 days.

In the treatment of this disease the essential condition for obtaining good results is to intervene as soon as possible, before or at the beginning of the appearance of the vesicles. We have obtained by this process an evident attenuation of the symptoms of the disease; the period of infection is shortened; such common troublesome incidents as anorexia, diminution of milk secretion, vesicles, and complications occur during a shorter time, as shown by control animals. The large quantity of serum

necessary—100 to 200 grams, according to size—has obliged us to limit its use to the more valuable animals—milk cows, pregnant cows, calves, work oxen, and fat steers. The intravenous inoculation of serum, made slowly, is very efficacious. It is with milk cows that the results are always less successful; with them it does not prevent with certainty the appearance of vesicles on the teats. None of our treated animals have died, although mortality has occurred among the controls.

We have made allusion in this note only to our purely practical tests and not to the tests on experimental animals, which have given results that were much superior.

CONTAGIOUS OR EPIZOOTIC KERATITIS OF BOVINES. A. Daille. Rev. Vet. (Toulouse), vol. 72 (1920), no. 1, pp. 1-10. (Abst. in Expt. Sta. Rec., vol. 44 (1921), no. 3, p. 280.)

The author reports having observed many cases of this affection in cattle imported into France from the United States. It is characterized by an acute corneal inflammation with a tendency to ulceration. The average incubation period is from three to six days, and perhaps longer. It is often serious, since it may lead to blindness or corneal blemishes. In affected animals observed by the author, blindness occurred in not more than 4 per cent. Good results are said to have been obtained by irrigating the eye with sodium borate or with oxycyanid of mercury, or in alternation of a 1 per cent solution of methylene blue with cocainized astringent collyria.

ANTHRAX IN MENAGERIE

Police authorities in different parts of Scotland have been rather exercised regarding an outbreak of anthrax, which occurred amongst the animals of a traveling menagerie.

How the outbreak occurred has not been definitely ascertained, but it is learned that the ravages of the disease first became evident in the death of a leopard. Subsequently, fine specimens of the lion, tiger, puma, and other animals became affected, and died.

The usual burial precautions were taken.—*Veterinary Record.*

REVIEW

ELEMENTARY EXERCISES IN PHYSIOLOGY. By Vierre A. Fish, D. Sc., D. V. M., Professor of Veterinary Physiology, New York State Veterinary College, Cornell University. Fourth edition, revised, 1921, 126 pages, with 33 illustrations. Comstock Publishing Co., Ithaca, N. Y. Price $3.00.

The appearance of the fourth edition of this book is welcomed, for it brings this standard text book strictly up to date. The book is a guide for students pursuing the laboratory course in physiology. The author has made an admirable selection of experiments which are elementary but fundamental in the physiological processes of the animal body. The exercises serve not only as a foundation for advanced work but also for clearer insight into the relation of the normal mechanism to pathology and medicine. The orderly arrangement of the experiments as well as the concise and clear cut manner in which they are presented highly recommend the book alike to the teacher and the student.

The work is divided into two main parts. In Part I on chemical physiology, there are six chapters devoted to the classification and examination of foods; six chapters on the various digestive jucies and allied body fluids; one chapter on the examination of milk and two chapters on blood. Part II deals entirely with experimental physiology. There are sixteen chapters covering the following exercises and experiments: Dissection of frog's heart, vagus and sciatic nerves and leg muscles; heart beat of frogs; the circulation of the blood; reflex action; Galvani's experiment; the induction coil; nerve stimuli; secondary and paradoxical contraction, ergograph; elasticity of muscle, independent irritability, sartorius experiment; the muscle curve, muscle work; veratrinized muscle, fatigue, tetanus; effect of temperature and load upon muscle, after load, induction in nerve, telephone experiment; vagus control of the heart, action of drugs; the sphygmograph, sphygmomanometer, pneumograph; the circulation; blood pressure, Stannius' experiment, maximum contractions, staircase contractions, motor centers, temperature, isolated apex and intracardiac inhibitory center.

The appearance and mechanical portion of the book are excellent. Alternate blank pages are furnished for the taking of notes by the student in the laboratory. L. T. G.

ESSENTIALS OF VETERINARY PHYSIOLOGY. By D. Noel Paton, M. D., B. Sc., LL. D., F. R. S., Professor of Physiology, University of Glasgow, and Late Lecturer in Physiology, Royal (Dick) Veterinary College, Edinburgh, and John Boyd Orr, D. S. O., M. C., M. A., M. D., D. Sc., Director, Rowett Institute for Research in Animal Nutrition, Aberdeen. Third edition, revised and enlarged, 1920, 674 pages, with 246 illustrations. W. Green and Son, Ltd., Edinburgh.

The third edition of "Essentials of Veterinary Physiology" has been practically rewritten for the purpose of bringing the subject matter up to date and to give an increased prominence to those features which have an intimate bearing upon veterinary practice. It is considerably larger and more expanded than the second edition, which has been out of print for several years. The volume is divided into four parts, the first part treating of the growth of physiology. The second part is subdivided into three sections, with a complete discussion of the tissues and general metabolism, while part three has eight sections, in which the nutrition of the tissues, food, digestion, absorption, circulation, respiration, excretion, immunity, etc., are fully covered. Part four treats of the reproduction and development of the animal. Dr. Burns is given credit for the section on hydrogen ion concentration in the appendix. Throughout the text a successful effort is evident to give the essentials of both general physiology as well as of special physiology of the domesticated animals in such a concise manner as to be suitable to the requirements of both the student and practitioner of veterinary medicine. The work, which is well illustrated, is intended to supplement rather than replace demonstrations of a practical nature from which alone, the authors state, "physiology can be properly learned." Altogether the volume will prove to be a valuable addition to the literature of our profession, and the publishers have not spared themselves in making the physical appearance of the book most attractive.

ARMY VETERINARY SERVICE

PRAISE FOR BRITISH ARMY VETERINARIANS

A tribute to the efficiency and value of the British Royal Army Veterinary Corps appears in an official dispatch by General Sir G. F. Milne, commanding the Army of the Black Sea. The dispatch says:

"All surplus animals have been disposed of. * * * Approximately 5,000 horses and 17,000 mules brought in prices which averaged 50 and 42 pounds sterling, respectively. The fact that such prices were obtained was largely due to the splendid condition of the animals, thanks to the conscientious work of the Royal Army Veterinary Corps under Lieutenant-Colonel W. A. Jelbart."

There are 808 veterinarians in Belgium, classified as 714 civilians and 94 in military service, according to a list published in the Belgian journal *Annales de Medecine Veterinaire*. Eleven of the army veterinarians are on the retired list and 4 are stationed in the Congo.

In an article on "The Horse Situation Today," by J. O. Singmaster, in the *Breeder's Gazette*, the author says: "Judging from the depression of the '90's I am sure that I know what will happen. Farmers will continue buying mares as rapidly as possible while light money conditions keep down values. Then, so soon as our country gets down on a normal basis financially, there will be the greatest demand for good stallions that we have ever seen. Stallion breeders must have good horses to head their breeding. They will bid up for the better stallions when the prices of these better stallions are rising."

A FINE POINT IN FREIGHT CLASSIFICATION

Switch Tender—And what was the terrible fight about down at the freight yards this morning?

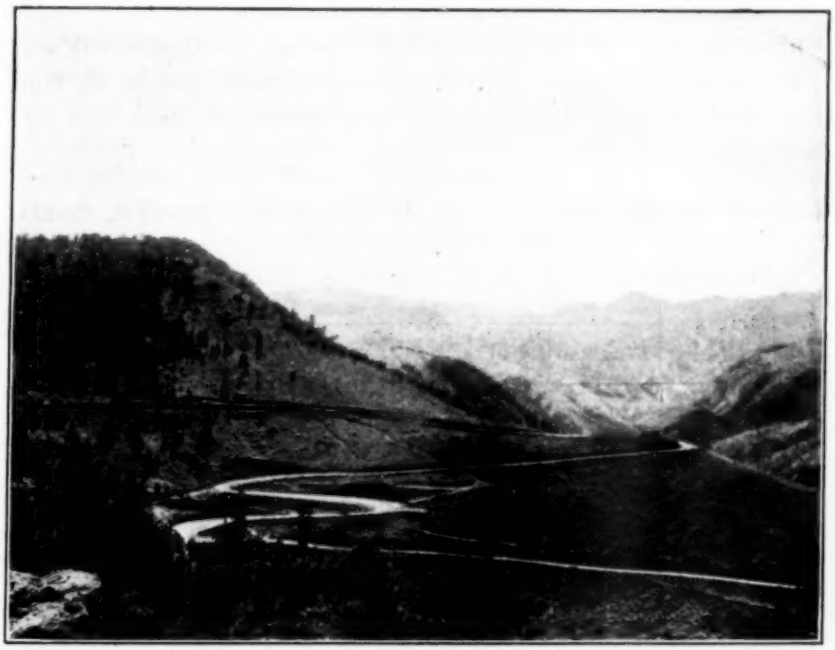
Track Walker—Sure now, 'twas all over a young elephant what a circus man wanted to ship to Saint Looey. Murphy said it was nursery stock, O'Brien claimed it should go at trunk rates and Dugan swore they should bill it as a baby grand!—*Life.*

ASSOCIATION NEWS

PROGRAM FOR A. V. M. A. MEETING

Members will be interested in knowing that an excellent program is being prepared for the Colorado meeting. One of the leading veterinarians of Mexico has promised a paper. Plans are being made to have one of the most prominent veterinarians in the British Army Veterinary Service present a paper. One of the leading Shorthorn breeders of America has promised to give an address and a veterinarian who knows more about losses of livestock in transportation than probably any other veterinarian in America will speak on this subject.

Doctor Ferguson, who has charge of the Section on Practice, reports that the program for this section is well under way. Doctor Muldoon, who has charge of the Small Animal Section, states that he is getting an excellent program on small animal and poultry diseases. The chairman and secretary of the Section on Sanitary Science state that their program will be a fine one, and Doctor Goss of the Section on Faculties and Examining Boards is also planning an excellent program.



Engineer's Lariat, Lookout Mountain, Colorado. A drive over this route is one of the attractions of the A. V. M. A. convention, to be held at Denver, September 5 to 9, 1921.

Among the contributions already promised for our program are:

Municipal Food Inspection, Dr. Geo. H. Glover, Ft. Collins, Colorado; Garbage Feeding in Relation to the Control of Hog Cholera, Dr. F. Torrance, Ottawa, Canada; Ictero-hemoglobinuria, Drs. Edward Records and Lyman R. Vawter, Reno, Nevada; Tuberculosis in a Shetland Pony; Drs. B. A. Beach, H. B. Peiper and F. B. Hadley, Madison, Wisconsin; Poisonous Plants of the Western Ranges (illustrated), Dr. C. Dwight Marsh, Washington, D. C.; Studies to Determine the Value of Chicken-Pox Vaccine, Drs. Fred Boerner and E. L. Stubbs, Philadelphia, Pennsylvania.

All who have to do with the program for the Denver meeting are striving to furnish a program that will make it profitable for every member of the Association to be there.

It is needless to state that the opportunity for having a delightful outing is also unexcelled. The notices from the Colorado members that have appeared in THE JOURNAL are evidence that they will give us a royal western welcome that will be remembered by everyone.

The Secretary has recently sent out letters to about a hundred veterinarians who sent in their applications for membership while they were at Camp Greenleaf. As no remittance was sent with these applications, they could not be acted upon at the time they were sent in. It is hoped that a number of these will join the Association.

HOTEL RATES FOR A. V. M. A. MEETING, DENVER, COLO., SEPTEMBER 5-9, 1921.

Name	Without bath		With bath		Distance from Auditorium
	1 in room	2 in room	1 in room	2 in room	
Albany	$2 to $3	$3.50 to $5.50	$3, $4, $5, $6	$5, $6, $7, $8, $10	4 blocks
Brown Palace	$3	$6	$6	$8	8 "
Savoy	$2 to $3	$3 to $4	$3 to $5	$4 to $6	9 "
Shirley	$2.50	$4	$3	$5	9 "
Kenmark	$2 & up	$3.00 & up	$3 & up	$4 & up	6 "
Auditorium	$——	$2.50, $3, $3.50	$——	$3.50, $4, $4.50, $5	1 "
Oxford	$1.50-$2	$3 to $4	$2.50-$3	$5 to $6	8 "
Metropole	$——	$3.50 & up	$——	$5 & up	9 "
Standish	$1.50 & up	$2.50 & up	$2.50& up	$3 & up	3 "

A letter from Dr. W. A. Hilliard of Winnipeg states that he is making an active campaign of the Province of Manitoba for A. V. M. A. members, and Dr. Bergman of Iowa, resident secretary for that State, is also working hard to secure members from that State. Dr. Bux of Arkansas has sent letters to all eligible veterinarians who are not now members of the A. V. M. A. in Arkansas.

All resident secretaries are urgently requested to make an active effort to secure new members. Every member of the A. V. M. A. can help in this good cause. N. S. MAYO.

NOTES FROM SECRETARY'S OFFICE

All members of the A. V. M. A. and visitors who are planning to go to the Denver meeting the first part of September, should remember that they can buy their tickets to Colorado Springs and return just as well as to Denver and at the same price. This will enable them to visit the beautiful city of Colorado Springs and also Pike's Peak, if they so desire. Also remember that you can go out over one route and come back over another at the same rate.

The Executive Board has ruled that only those members who have paid their dues for the current year are entitled to vote at the meeting. This is in conformity with the constitution and by-laws. As the next meeting comes after the 1st of September, according to this ruling only those will be entitled to vote who have paid their 1921 dues. Statements for the 1921 dues will be mailed out about the 1st of August.

In accordance with this ruling of the Executive Board, the Secretary has secured buttons for members and visitors. The members' buttons entitling them to vote will be given out at the meeting.

In this number of THE JOURNAL there is published a list of applications received to date. For the first time there is an application for membership from Mexico, one from Argentina, one from Uruguay, and one from Porto Rico. This indicates that the American Veterinary Medical Association is being recognized as one of the world's most efficient organizations in the veterinary field.

The program for the Denver meeting is well under way. The chairmen of the sections report that they will have their programs completed by about the 1st of July. The program will be printed, and a copy sent to each member of the Association at the time the statement for dues is sent out.

During the month of May a letter was sent to every Army veterinarian who is not a member of the Association, urging them to join the A. V. M. A. Letters were also sent to those who were back in their dues and the response is very encouraging.

N. S. MAYO.

LIST OF APPLICANTS FOR MEMBERSHIP IN A. V. M. A. TO JUNE 1, 1921

Babcock, F. M.....Emporia, Kans.
Bacon, E. S....Valley Center, Kans.
Baker, Bruce.....Meeker, Colo.
Barnes, J. R....Kansas City, Kans.
Barr, A. C.....Kansas City, Kans.
Bell, C. M.....Waldron, Ark.
Bilikam, Lewis.....Tacoma, Wash.
Camuti, L. J..Bronx, New York City
Corey, W. H.....Newport, Me.
Cass, H. L.,
North Portal, Saskatchewan, Can.
Cattanack, J. J.....Newark, N. J.
Chapin, C. W.....Baton Rouge, La.
Coleman, A. T.....Monrovia, Calif.
Collins, A. G.....Kansas City, Mo.
Conley, O. R.....Manhattan, Kans.
Cook, C. E.....Front Royal, Va.
Cooper, W. R.....Kansas City, Mo.
Curtis, C. A...Albuquerque, N. Mex.
Davis, C. H.....Crassett, Ark.
Draney, C. E.....Omaha, Neb.
Edwards, W. L.....Visalia, Calif.
Ehle, A. M.....Oak Grove, Mo.
Eriksen, Sivert...Manhattan, Kans.
Fields, S. M.....Pomona, Calif.
Franz, G. A.....Omaha, Neb.
Gaston, J. T.....Kansas City, Mo.
Graham, H. W.....Yuma, Colo.
Graves, Arthur...Kansas City, Mo.
Griffin, R. S...Salt Lake City, Utah
Grim, G. W.....Plainsboro, N. J.
Grubb, E. A.....Olympia, Wash.
Harrison, J. R. N.,
Winnipeg, Manitoba, Canada
Heller, D. C.....Mason City, Iowa
Herberich, D. R.....Chatsworth, Ill.
Hermann, A. A.....Denver, Colo.
Huffman, P. J.....Natchez, Miss.
Irons, G. T.....Los Angeles, Calif.
Jaquiss, W. A.....Seattle, Wash.
Johnson, B. C.....St. Paul, Minn.
Kalmansohn, Jacob..Dubuque, Iowa
Kampschmidt, F. L.,
Los Angeles, Calif.
Kellogg, C. F....Los Angeles, Calif.
Kitschman, C. H..Manhattan, Kans.
Klee, W. F.....Lima, Peru, S. A.
Kneup, F. G.....Evergreen, Ala.
Kockendorfer, F. C...Decorah, Iowa
Koen, A. R.....Los Angeles, Calif.
Lemon, C. S.....Augusta, Ga.
Lloveras, D. C.,
Buenos Aires, Argentina, S. A.
McChesney, I. G...Kansas City, Mo.
McGilvary, J. T.Sioux Falls, S. Dak.
McKenzie, W. H.,
Vancouver, B. C., Canada
McLeod, J. C.....Cincinnati, Ohio
Maier, L. F.....Detroit, Mich.
Major, D. D.....Epley, Miss.
Martin, A. D.....Boston, Mass.
Mills, A. M.....Kamuela, Hawaii
Mourning, R. S..Kansas City, Kans.
Mustard, H. W.,
Vancouver, B. C., Canada
Nelson, M. D.....St. Joseph, Mo.
Noonan, J. E...Newport News, Va.
Painter, G. D...Kansas City, Kans.
Parker, J. W.....Kansas City, Mo.
Paxton, G. M.....Baton Rouge, La.
Paxton, J. D...Nelson, B. C. Canada
Pick, W. R.....Camp Travis, Tex.
Pou, A. C.....Ponce, Porto Rico
Putnam, R. M.....Richmond, Va.
Rich, Gerald.....Augusta, Ga.
Royal, A. J.....Hollondale, Miss.
Rowan, F. B.....Rockford, Ill.
Santa Maria, L.,
Piedras Negras, Coah., Mexico
Schlegel, J. O.....Kansas City, Mo.
Seligman, A.....Dubuque, Iowa
Shook, L. L.....Coblenz, Germany
Smith, J. P. F...Kansas City, Kans.
Stirling, E. R.,
Raysandi, Uruguay, S. A.
Tierman, B.....Kansas City, Kans.
Traylor, T. E.....Denver, Colo.
Weisman, L. G..Ft. Huachuca, Ariz.
Winkler, G. W.....Kansas City, Mo.
Wedemeyer, V...Independence, Mo.
Worthington, J. W...Ft. Reno, Okla.

A. V. M. A. REPORTS

An inventory of the boxes of material forwarded to me by the former librarian of the A. V. M. A. gives the following number of reports that are available for sale at 25 cents per copy, f. o. b. Chicago.

The annual reports for 1906, 63; 1907, none; 1908, 86; 1909, 199; 1910, 145; 1911, 199; 1912, 20; 1913, 363.

It should be noted that the reports for 1911 have been badly damaged and few of them are in such condition that they can be used, as the box has evidently been thoroughly soaked with water at some time.

If any of the members would like copies of these reports, I shall be glad to supply them at the price set by the executive board.

N. S. MAYO, *Secretary.*

PANTS LOST?

The Secretary's office received from the former librarian, Dr. J. N. Frost of Ithaca, New York, thirty-one boxes of books and other A. V. M. A. material that had been in charge of the librarian.

In opening one large box it was found to contain about fifty pairs of new trousers. I am wondering if this material does not belong to the Order of the Blue Owls that was instituted several years ago by Dr. John Blattenberg.

If these trousers do belong to the Blue Owls, and they will send me a description of their trousers and size, I will try to fit them out.

N. S. MAYO.

THE PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION

The above Association at its annual meeting in January voted to present to the University of Pennsylvania a fund to establish a scholarship in the School of Veterinary Medicine. Nominations to the scholarship are to be made by the Executive Committee of the Association. The appointment is to be for the full course of four years, provided the appointee maintains himself in good standing, but should he not be in good standing at the completion of any year his appointment is to terminate and the scholarship is to be awarded to another applicant.

C. S. ROCKWELL, *Resident Secretary.*

MASSACHUSETTS VETERINARY ASSOCIATION

The Massachusetts Veterinary Association held its annual meeting at the New American House, Boston, Wednesday evening, April 27, there being 37 members and 16 guests present.

A report was made by the different committees which are arranging for the tuberculosis conference which is to be held in Boston on June 22, 23 and 24. This report indicates that the announcement of the meeting is being received by veterinarians and livestock breeders in New England with considerable enthusiasm and a large attendance is already promised.

The election of officers resulted in the election of Dr. E. W. Babson as president, Drs. D. W. Gilbert and C. A. Boutelle, vice presidents, H. W. Peirce secretary and treasurer. The retiring president, Dr. E. T. Ryan, extended a vote of thanks to the members for the assistance which they had given him in the conduct of the Association during the past year. Owing to the fact that a banquet is to be held in June, the annual banquet was dispensed with at this meeting.

Dr. Cassius Way, of Brooklyn, N. Y., gave a very interesting and instructive talk on "Dairy Herd Efficiency and Suggestions for the Control of Disease." This talk was well received by the members and visitors and opened up a discussion which lasted well into the evening.

A buffet lunch was served, and the meeting adjourned at 10:15 p. m. HARRIE W. PEIRCE, *Secretary.*

THE WOMEN'S AUXILIARY TO THE A. V. M. A.

At the time of the Kansas City meeting of the A. V. M. A., in 1917, there was organized a Women's Auxiliary to the Veterinary Relief Committee, the primary object of which was to furnish pecuniary assistance to the wives and families of veterinarians in need of such help. Since that time the organization has added much to its membership, its funds and its influence. It is now called The Women's Auxiliary to the A. V. M. A., and its members are contemplating a change of purpose.

It is proposed that the original plan of relief to the families of veterinarians be enlarged to include a loan fund for students who are attending any of the recognized veterinary colleges in the United Sates and Canada, who may need financial assistance. For the first year or two, the fund necessarily will be small;

but, as the membership of the organization is enlarged and the dues accumulate, the funds will be increased and the field of usefulness will expand.

The details controlling the issuance of the loan or loans are not yet ready for publication, and probably will not be given out until after the Colorado meeting, as the report of the committee appointed to formulate rules governing the fund will not be acted upon until that meeting. However, if all goes well, the funds will be ready for distribution at the beginning of the college year in September, 1922.

As the chief source from which the loan fund will be derived is the accumulated initiation fees and membership dues, the Auxiliary is anxious to add to the number of its members, and thus increase its powers of usefulness. The initiation fee is 50 cents and the dues are $1.00 per year (as voted at Columbus), payable to the Secretary. The wives, daughters, mothers and sisters of members of the A. V. M. A. are eligible to membership. Meetings are held annually, in conjunction with the annual meetings of the A. V. M. A. There have been but two presidents, Mrs. A. T. Kinsley, 616 East 59th Street, Kansas City, Mo., the present incumbent and the founder, Mrs. W. H. Hoskins, of New York City. Mrs. Ashe Lockhart, 3835 Baltimore Avenue, Kansas City, Mo., is the Acting Secretary.

The Auxiliary asks, as a special favor, that each veterinarian who may read this, will pass it on to the ladies of his family, in order that they may know what we are trying to accomplish, and may have an opportunity to join us if they wish.

Mrs. H. P. HOSKINS,
Mrs. C. D. FOLSE,
MRS. C. H. STANGE,
Auxiliary Loan Fund Committee.

NORTHERN SAN JOAQUIN VALLEY ASSOCIATION

The purpose of the following meeting was to organize the veterinarians in the northern end of the San Joaquin Valley.

The enthusiasm for this meeting grew out of the San Joaquin Valley Veterinary Medical Association meeting, which was held in the Modesto Hotel, Modesto, California, on May 3.

The need of this organization was felt because of the long distances necessary for the veterinarians to travel, who are located

at either end of the valley, in order to attend the San Joaquin Valley Association meetings.

It was at the Modesto meeting on May 3, that the writer was appointed temporary secretary to send out notices of a meeting to be held at the Modesto Veterinary Hospital, on May 25.

The minutes of the meeting are as follows:

The house was called to order and the following officers elected, Dr. Haney, President; Dr. Thomas, First Vice-President; Dr. Roberts, Second Vice-President; Dr. Ball, Secretary-Treasurer.

The following names were suggested for the organization: Central California, Sunset, Northern San Joaquin Valley.

Dr. Thomas moved that the organization be named The Northern San Joaquin Valley Veterinary Medical Association, which was seconded by Dr. Diller and carried.

Standing Committees:

Disease—Drs. Steiger, E. Wrinkle of Oakdale, Wrinkle of Stockton.

Finance—Drs. Cilker, Ball, Roberts.

Resolutions—Drs. O'Neal, Thomas, Diller.

After a short discussion it was decided that the various meetings be held in the surrounding cities and towns. The veterinarians in these places will be responsible for the program.

Dr. Diller invited us to Stockton, on June 22, which is the date of our next regular meeting. Carried.

There being no further business the meeting adjourned.

R. A. BALL, *Secretary.*

KANSAS STATE COLLEGE ANNUAL VETERINARY BANQUET

In response to an invitation from the Veterinary Division of the Kansas State College the writer enjoyed going back to our old "stamping ground" for the annual banquet of the students, alumni and faculty of the Veterinary Department.

The banquet was held at the Hotel Gillette, Manhattan, with about 100 present. Capt. C. E. Sawyer of the senior class was toastmaster. There were responses from representatives of the various classes and a class prophecy for the senior class. The writer gave the longest address of the evening. President Jardine of the college told of the excellent progress the Veterinary Division was making and how important its work was to the farmers and stockmen of Kansas. That this service was ap-

preciated was shown by the appropriation by the legislature of $100,000 for a new clinical building. Major J. H. Gould from Fort Riley spoke of the changed conditions of veterinary practice, not only in the army, but also in civil life. Dean Dykstra told of the hearty cooperation and good fellowship that existed between the students and faculty of the Veterinary Division.

The writer organized the Veterinary Department of the Kansas Agricultural College more than thirty years ago and spent ten years there as a teacher. It was a pleasure to go back to the scene of one's earlier efforts, to recall the hopes and aspirations of other days, to note how far one had fallen short of the ideals set and to see the wonderful growth in the department that has taken place in the past thirty years. It was good also to see the billowy prairies of the West that I knew so well in years long gone by.

"Sweeter to me than the salt sea spray, the fragance of summer rains.
Nearer my heart than these mighty hills are the wind-swept Kansas plains.
Dearer the sight of a shy wild rose by the roadside's dusty way,
Than all the splendor of poppy fields ablaze in the month of May.
Gay as the bold poinsettia is and the burden of pepper trees,
The sunflower, tawny and gold and brown is richer to me than these,
And rising ever above the roar of the wild insistent sea,
Is the voice of the prairie calling, calling me."

N. S. MAYO.

TENTH PHILADELPHIA WORK HORSE PARADE

The tenth Philadelphia Work Horse Parade was held in Philadelphia on Wednesday, May 11. There were 496 horses in the parade. The veteran drivers' class was a feature. One of these old-timers has been driving since 1865, and is still on the job, having been for the past 40 years employed by the same firm. The parade was under the auspices of the auxiliary to the Pennsylvania S. P. C. A., and was reviewed from the grandstand in front of their headquarters by a number of notable persons.

There were many silver cups given to the champions in all classes. The grand championship cup was given to "Laddie," owned by George B. Newton Coal Company, Philadelphia, Pa. The judges were Drs. C. J. Marshall and H. R. Church, and Hon. Frank C. Caven.

C. S. ROCKWELL, *Resident Secretary.*

NORTH CAROLINA NEWS

The North Carolina Veterinary Medical Association has been busy during the last session of the legislature, and has secured a good amendment to our State law by which any of the quacks that have been practicing prior to 1903 have got to register with the State Board of Veterinary Examiners, instead of registering with the Clerk of Court. This is made secure by the addition of a penalty clause to the law. The amendment means much to the profession here. It is hard sometimes to overcome the efforts of the quacks in the legislature, for they have friends too.

The State Board will hold its examination at Wrightsville Beach, June 28, and the State Association will hold its meeting on June 29 and 30. We have some very strong men on the program. It is very likely that the B. A. I. will hold an examination on June 28 for the graduate veterinarians of the State to qualify to do tuberculin testing for the accredited herd work. These examinations are held under the supervision of the B. A. I. officials. L. J. HERRING, *Resident Secretary.*

OKLAHOMA STATE VETERINARY MEDICAL ASSOCIATION

At a meeting of the Executive Committee of the O. S. V. M. A. held June 3, at Oklahoma City, Oklahoma, it was decided that it would serve the best interests of the veterinary profession of the State to change the date of the coming mid-summer meeting from July 12 and 13, as previously announced, to June 24.

The reason for the above change was because the Federal-State tuberculosis examination was held on June 25, and it was considered feasible by the committee to have the meeting approximate and precede this examination, since subjects pertaining to tuberculosis work would be freely discussed.

H. WOOD AYERS, *Secretary.*

VIRGINIA VETERINARY MEDICAL ASSOCIATION

The Virginia Veterinary Medical Association will hold its 27th annual session in Roanoke, Va., July 14-15. The program which is now in press, contains such speakers and subjects as the following:

B. H. Ransom, Animal Parasites; B. F. Kaupp, Poultry Diseases; R. E. Brookbank, Accredited Herd Work; J. G. Ferneyhough, The Three Tuberculosis Tests; Col. T. Gilbert Wood, an address. Other subjects to be covered are Angus cattle in Virginia, Duroc hogs in Virginia and dairy cattle in Virginia.

The State Board will conduct the regular examination in the same city on July 14. W. G. CHRISMAN, *Secretary.*

WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the Western New York Veterinary Medical Association will be held July 14, 1921 at Hamburg, N. Y.

A good attendance is requested as there are important matters to come before the meeting, and Dr. Rafler and Baker assure us of a good time and menu afterwards. The ladies are cordially invited. F. F. FEHR, *Secretary.*

MONTANA VETERINARY MEDICAL ASSOCIATION

The fourteenth annual meeting of the Montana Veterinary Association will take place in Bozeman, Mont., on July 29 and 30. The outstanding feature of the meeting will be a clinical demonstration and address on sterility by Dr. B. T. Simms, of Corvallis, Oregon. N. T. GUNN, *Secretary.*

LABORATORY SECTION OF THE PHILADELPHIA VETERINARY CLUB

The Laboratory Section of the Philadelphia Veterinary Club held its regular monthly meeting and last meeting for the summer on Tuesday evening May 24, at the Veterinary School, University of Pennsylvania. At 7.30 p. m. the laboratories were opened up for inspection. The meeting was called to order

at 8.30 p. m. Dr. Theobald Smith, director of the Department of Animal Pathology, Rockefeller Institute for Medical Research, Princeton, N. J., delivered a lecture on Bovine Infectious Abortion, and gave a lantern-slide demonstration of the same. This subject was discussed very thoroughly by Drs. Barnes, Lewis, Hart, E. S. Deubler, E. C. Deubler, Ridge, Van Sant, Eves, Dick, C. J. Marshall, and J. F. DeVine.

This was a very interesting meeting, with about 75 in attendance. C. S. ROCKWELL, *Secretary.*

PLAN FOR TRANSFER OF MEMBERSHIP

The Missouri Veterinary Medical Association has inaugurated a movement in cooperation with veterinary medical associations of other States with the view of making it possible for a B. A. I. veterinarian to transfer his membership from one State veterinary medical association to similar associations in other States when he is transferred from one State to another in the course of his official assignments. This is a very commendable movement and no doubt would prove beneficial both to the State veterinary medical associations and the Bureau employees.

CHOSEN STATE VETERINARIAN

Dr. Thomas E. Robinson of Westerly, R. I., was chosen State Veterinarian to succeed Dr. J. S. Pollard, resigned, at a meeting of the State Board of Agriculture.

In addition to being elected to the office of State Veterinarian Dr. Robinson was chosen to represent the Society for the Prevention of Cruelty to Animals for the town of Westerly.

How Knowledge is Spread

Mr. Augustus Linkins, of Sunville, Alabama, was reading an old newspaper in which he chanced upon an item he thought might interest his friend.

"I observes by dis papah," said Mr. Linkins, "dat de smallest cows in de world is to be found in de South Seas. Dis papah says dat de average weight of sich a cow does not exceed one hundred an' fifty pounds."

"Does yo' suppose," asked his listener, "dat dat's where dey gits de condensed milk from?"—*Harper's Magazine.*

COMMUNICATIONS

OHIO UNIVERSITY ALREADY HAD FOUR-YEAR COURSE

To the Editor:

During the discussion of the question of accrediting the St. Joseph Veterinary College a statement was apparently made by Dr. R. C. Moore at the Columbus meeting concerning the change from the three-year to the four-year course which should not have gone unchallenged at the time. As reported in the Proceedings, Dr. Moore spoke as follows: "Precedent has been set in this Association several times regarding similar conditions with colleges. Most of you remember that we went from three to four-year course, but there were several of our best institutions that did not move up the time to the four-year course as this Association required. I think, if I am not mistaken, the institution presided over by your President is one. The Veterinary Department of the great University of Ohio was another; New York another; Toronto another. They could not do so at once, but promised to move up to it as rapidly as they could, and they were not rejected." (*Journal of the A. V. M. A.*, December, 1920, pp. 327, 328.)

In this grossly incorrect and unjust statement there is an element of truth. The Veterinary College of the Ohio State University—I speak only for it—could not "move up the time to the four-year course" and for the sufficient reason that that college put into force the four-year course together with an entrance requirement of 15 units several years before—to be specific, in September, 1915.

Very truly yours,

Columbus, Ohio.

S. Sisson.

TORSION OF THE UTERUS

To the Editor:

I have just read with interest the paper by C. R. Rey of California on "Torsion of the Uterus" in the cow in a recent Journal.

I take it, from what he says, that California cows must be built like automobiles and put together with bolts, screws, washers and cotter pins and will stand manipulating with jacks, money-wrenches and crow-bars. Now in my poor little seventeen years' experience, largely among Jersey dairy cattle, I

have met several of this type of cases and they gave me the usual trouble and the usual result until, a few years ago, a Dr. H. Bannister, who was in the employ of the B. A. I., told me what to do and how to do it. I have had opportunities to try his method and have found it very satisfactory, both to myself and the owner.

As Dr. Rey states, the cow has usually been in labor for some time when we are called and she has likely had some lay interference. Therefore time is of rather more than usual importance. Dr. Bannister's method is an incision well up, through Viborg's triangle, on the right flank. Incision should be only long enough to admit the hand. This brings the hand right on top of the uterine wall. Trace the wall back to the torsion and absolutely satisfy yourself, by feeling, as to the direction of the twist. Grasp the uterine wall at any convenient point, but anterior to the torsion and give a good, strong pull or lift. In my cases the uterus has almost instantly rotated itself back into normal position. Give the wound proper surgical attention. Make a manual examination and satisfy yourself that the calf is in normal position. If such is the case, let the cow alone. She will deliver her calf during the next half-day. Of course, if the cow needs further help, give it to her, but be sure she does need it. Dr. D. S. White had a favorite remark which he frequently made when lecturing to us on Theory and Practice, *i. e.*, "Gentlemen, be as careful as possible. Some of your patients will get well in spite of anything you may do."

Tampa, Fla. FRED W. PORTER.

VETERINARY DEGREE AT NEW YORK UNIVERSITY

To the Editor:

In conformity with the recommendations of the A. V. M. A., the faculty of this college recommended to the Chancellor and Council of New York University that on and after 1922 the degree conferred by this college upon her veterinary graduates be changed from that of Doctor of Veterinary Surgery to Doctor of Veterinary Medicine.

I am just in receipt of advice from the Registrar that the Chancellor and Council have approved this recommendation.

W. HORACE HOSKINS, *Dean,*
New York State Veterinary College
at New York University.

NECROLOGY

The many friends of Dr. Calvin C. Cole will be surprised and grieved to learn of his sudden death at Wilmington, Del., on May 16. Dr. Cole was a graduate of the Veterinary Department of the University of Pennsylvania in the class of 1894. After graduating he practiced his profession in the State of Delaware from 1894 to 1911. On March 6, 1911, he was appointed veterinary inspector in the U. S. Bureau of Animal Industry and was assigned to duty in the meat-inspection service. On August 1, 1917, he was transferred to hog-cholera-control work in the State of Maryland, where he remained until the time of his death.

Dr. Archie R. Lundell, first assistant to Dr. E. C. Joss, Inspector in Charge, Portland, Oreg., died May 7, 1921, following an operation for cancer of the stomach. Dr. Lundell was born in Webster City, Iowa, October, 1885. He graduated from the Chicago Veterinary College in 1908, in which year he entered the service of the Bureau. For several years prior to his death he filled the position of first assistant to the inspector in charge at Portland, Oreg. Throughout his connection with the Bureau his service was marked by efficiency, loyalty and devotion to duty. He leaves a widow but no children.

COUNTY TESTS ALL CATTLE FOR TUBERCULOSIS

The cattle of Hinds County, Mississippi, are practically free from tuberculosis. Following a vote of citizens in the county to eradicate the disease, the project of testing the cattle for tuberculosis was recently completed. The tests required approximately 65 days. During this time 3,992 herds, containing 35,752 cattle, were tested by State and Federal veterinarians. Only 49 reactors were found, which is equivalent to slightly more than one animal in each 700. However, in addition to the 49 tuberculous cattle disclosed by the test, 53 had been removed several months before as a result of accredited herd testing. Hinds County is the county in which Jackson, the State capital, is located.

MISCELLANEOUS

THE WORM TURNS

Washington is noted for its clever dinners, and this reputation is maintained even in an era of prohibition. Occasionally a scientific body succumbs to the prevailing spirit and puts aside its gravity long enough to consider the lighter side of life. The last annual dinner of the Helminthological Society of Washington was enlivened by some song parodies, selections from which are given below. Some of the personages with whom liberties were taken by the rhymesters are veterinarians and others are well known to the profession.

SING A SONG OF THYMOL

(Tune, "Son of Gambolier")

By M. C. HALL and E. A. CHAPIN

Sing a song of thymol,
A pocket full of hooks;
A patient full of all the worms
You read about in books.
When the man was opened
They found the worms had fled.
The doctors they were satisfied;
The patient—he was dead!

A pound of chenopodium,
A quart of castor oil,
Radix filicis q. s.;
Bring them to a boil.
Sig.—Four ounces hourly,
Enough to nicely fill;
When the patient overflows,
Have him make his will!

There was a little nematode,
No bigger than a hair,
They introduced some chloroform
To drive him from his lair!
And when the storm was over
They counted up the dead;
That blasted little nematode
Now totaled forty head!

Forty-nine cute little bots
A-living in a horse.
Forty-nine cute little bots
A-living in a horse.
If you take a capsule
And drive it home with force,
There'll be many less than forty-nine
A-living in the horse!

There was a man named Ackert,
And he was wondrous wise,
He tried to feed a tapeworm
To some unsuspecting flies.
He put the little rascals
In a cage of proper size;
But as for raising tapeworms,
He couldn't get a rise!

The bulldog has an awful bite,
We know that this is true;
But when it comes to biting
There are things he can not do.
The stomach worm is little,
He has no bones or fat,
But he can bite a sheep inside—
A bulldog can't do that!

SING A SONG OF SCIENTISTS

(Tune, "Away, Away, With a Sword and a Gun.")

By M. C. HALL

Dr. L. O. Howard

O, here's to Howard, called L. O.
Not 'ello Bill! O, no! O, no!
No one would dare to treat him so!
O, no! O, no! O, 'ell! O, no!

Chorus

Away, away, with a fly and a flea!
The realm of bugs belongs to me.
Who touches a scale of yon insect's tail
Dies like a dog! March on! said he.

Surgeon-General Cumming

O, here's to Cumming, Surgeon-Gen.,
Well known to all the medic men.
He wields the test-tube, sword and pen.
O, here's to Cumming, Surgeon-Gen.

Chorus

Away. with typhus, plague and fleas!
We stand on guard against disease!
We hold the fort at every port
And ward off perils from the seas!

Dr. Ch. Wardell Stiles

O, here's to Stiles, the hookworm man.
He always has some lovely plan.
It sometimes ends where it began.
O, here's to Stiles, the hookworm man.

Chorus

Away, away, with a sword and a gun!
Let the eagle soar! Let the hookworm run!
We'll weather the storm in our uniform
And lick the ameba and the Hun!

Dr. B. H. Ransom

O, here's to Ransom, he's the bird
That hardly ever says a word.
He thinks that talking is absurd.
O, here's to Ransom, he's a bird!

Chorus

Away, away, with a louse and a flea!
A tapeworm's life is the life for me.
His quiet life is free from strife;
That speechless life must happy be!

Dr. Albert Hassall

O, here's to Hassall's shiny dome,
That lights him nightly to his home.
There's nothing left for him to comb!
O, here's to Hassall's shiny dome.

Chorus

Away, away, with Sunny Jim!
Our catalog's filled to the brim!
Not a synonym or a homonyn
Can ever get away from him!

Dr. Cooper Curtice

O, here's to Curtice whose shrubbery
Conceals the face that none may see.
His smiling eyes he can't disguise,
But all the rest is wild surmise.

Chorus

O, here's to Curtice and his tick,
The dipping vat that turned the trick;
The cow and sheep in peace may sleep;
He binds their wounds, he heals the sick.

Col. Charles F. Craig

Although we have no Haig & Haig,
We'll drink a health to Colonel Craig.
The amœboid rim is clear to him,
Although to us it's rather vague.

Chorus

Away with craigiasis,
And trypanosomiasis!
We look to Craig to down the plague
Of human amebiasis!

Col. E. R. Whitmore

Colonel Whitmore, U. S. A.,
Has left the Army, gone away.
Now he can work or he can play,
And no B. G. can say him nay.

Chorus

Away with eagles, leaves and bars!
Away with shining silver stars!
We'll live in ease and rest in peace
And lay off worry, work and wars!

Dr. J. E. Ackert

O, here's to Ackert's poultry tape!
You pen the bird; the worms escape!
If this is so, we'd like to know
Just where do birdie's tapeworms go?

Chorus

Away with worms of every kind!
Let's cheer the chicken's worried mind!
Let's lift the loads of trematodes
And try to leave dull care behind!

ADDITIONAL FUNDS FOR TUBERCULOSIS ERADICATION

In order that tuberculosis-eradication work may be continued, Secretary of Agriculture Wallace, at the urgent request of Members of Congress and others interested in the live-stock industry, requested that an emergency fund amounting to $405,000 be included in the Deficiency Bill of the present Congress, to be used in the payment of indemnities for tuberculous cattle. It was estimated that this amount would be necessary to carry on the slaughtering of tuberculous cattle until June 30, the end of the fiscal year.

"For the present fiscal year," says the Secretary, in requesting the deficiency appropriation, "$800,000 was provided in the agricultural appropriation act for operating expenses in the eradication of tuberculosis, and $680,440 for the payment of indemnities for tuberculous cattle slaughtered. On account of the number of reacting animals found, the sum provided for indemnities is practically exhausted."

There remained sufficient funds to carry on the operating expenses for the remainder of the fiscal year, but, because the fund provided for indemnities was exhausted, it became necessary to discontinue the testing of new herds. If the emergency fund asked by Secretary Wallace is passed in the deficiency bill, the eradication-work can continue without serious interruption.

"For the first 8 months of the present fiscal year," the Secretary continues, "there were found by the tuberculin test 32,424 tuberculous cattle; whereas for the same months of the previous year there were found only 18,273 reactors. This is not an indication that tuberculosis is on the increase because there were tested, from July 1, 1920 to February 28, 1921, 792,398 cattle with 4.1 per cent of reactors; whereas during the previous year for the same months there were tested 419,376 cattle with 4.3 per cent of reactors.

"Another fact that should be taken into consideration is that the market value of cattle has decreased to an extraordinary degree, in fact the salvage received from the sale of tuberculous cattle was approximately twelve dollars per head less during these eight months than during the previous fiscal year, thus making it necessary that the department pay a larger percentage of indemnity than heretofore.

"It is estimated that for the balance of the fiscal year there

would be condemned for tuberculosis 13,500 cattle, and at an average rate of indemnity of $30 per head the total claims for Federal indemnity would amount to $405,000. Therefore this additional sum would be necessary to keep the work going along uninterruptedly to June 30."

That the various States are alive to the importance of the tuberculosis-eradication work is shown by the fact that the 36 States, in which legislatures have been in session since January 1, have appropriated nearly $4,000,000 for this purpose, and nearly $775,000 as emegency appropriations.

The Deficiency Bill with the $405,000 tuberculosis appropriation, passed the House on May 26 and the Senate on June 4. It was then sent to conference and was signed by the President on June 16.

REPORT ON CONDITION OF LIVESTOCK

Losses of livestock in the United States from disease and exposure have been smaller than usual during the past year.

The index number of condition as to healthfulness of horses and mules on May 1 was 96.2 as compared with 93 a year ago, and 95.7, the 10-year average. The loss from disease is estimated at 14.7 per thousand (equivalent to 369,000) as compared with 17.7 per thousand the preceding year, and 18.8 the 10-year average.

The index number of the condition as to healthfulness of cattle on May 1 was 95.8 as compared with 91.9 a year ago, and 94.9 the 10-year average. Losses from disease the past year are estimated at 17 per thousand (1,128,000 head) as compared with 19.6 per thousand the preceding year, and 19.7 the 10-year average. The losses of cattle from exposure were about 9.3 per thousand (615,000 head) as compared with 18.4 the preceding year, and 15 the 10-year average.

The index number of the condition of swine on May 1 was 94.4 as compared with 92.4 the preceding year, and 93.5 the 10-year average. Losses from disease the past year are estimated at 44.2 per thousand (2,946,000 head) as compared with 51.2 per thousand the preceding year, and 65.8 the 10-year average.

The index number of condition of sheep on May 1 was 95.4 as compared with 91.6 a year ago, and 95.3 the 10-year average. Losses from disease the past year are estimated at 22.9 per

thousand (743,000 head) as compared with 24 per thousand the preceding, and 23.3 the 10-year average. The losses from exposure were 14.8 per thousand (480,000) as compared with 32.8 per thousand the preceding year, and 29.2 the 10-year average. Losses of lambs during the past year from disease and exposure were about 46.2 per thousand (585,000) as compared with 65.6 per thousand the preceding year, and 57.5 the 10-year average.

Livestock throughout the United States are generally in good condition, although some losses of young pigs and lambs are reported due to inclement weather. Some heavy losses of cattle and sheep are reported in Arizona and New Mexico due to the poor condition of the range. Hog cholera appears to be increasing in Illinois, but very little is reported elsewhere.

TURKEYS SPREAD GAPEWORMS AMONG CHICKENS

Turkeys are probably the natural hosts of the gapeworm—a serious pest among young chickens—and are an important factor in their spread. This has been demonstrated as the result of experiments and other investigations carried on at Washington, D. C., and on farms in several localties in Maryland, as reported by Dr. B. H. Ransom, chief of the Zoological Division of the Bureau of Animal Industry, in Bulletin 939 of the Department of Agriculture.

During three winter seasons beginning in December, 1916, a total of 635 chickens and 679 turkeys were examined in the Washington city market. No gapeworms were found in the chickens, but 22.5 per cent of the turkeys were found to be infested. From 1 to 18 worms were found in each of the infested turkeys.

In view of the complete absence of gapeworms from a large series of adult chickens and their common occurrence in a similar series of adult turkeys, it would appear that adult chickens are poorly adapted as hosts of gapeworms. That turkeys above 3 years of age may harbor gapeworms is established by the fact that a turkey which was kept at the department's experiment station at Bethesda, Md., for three years after it was brought there was found after its death to be infested with a pair of worms.

In the perpetuation of gapeworms from year to year on in-

fested poultry farms the two chief factors, according to the bulletin, appear to be turkeys and contaminated soil. Whether, in the absence of turkeys from a farm, gapeworm affliction among chickens will regularly disappear has not been definitely established, but it seems probable that it may often do so. Gapeworms among chickens appear to be more prevalent on farms where turkeys frequent the chicken runs than on farms where there are no turkeys. Available evidence indicates that gapes has a tendency to disappear on farms following the removal of turkeys.

From experiments recorded in the bulletin, it has been found that chickens, unlike turkeys, are readily susceptible to infection with gapeworms only while they are young. They become less susceptible as they grow older. Adult chickens are seldom likely to spread infection, for in those instances in which gapeworms develop in adult chickens the parasites are likely to live only a short time.

Losses from gapeworms can be greatly reduced, if not altogether avoided, according to the bulletin, by keeping young chickens on ground that has not been exposed to contamination within at least a year by chickens with gapes or by turkeys, and by excluding turkeys from it during its occupancy by chickens. As gapeworms appear rarely to occur in adult chickens, brood hens may be associated with young chickens with little risk of infection. The simplest means of preventing or reducing losses from gapes appears to be the exclusion of turkeys from farms where chickens are raised.

THE GOVERNMENT ABATTOIR AT TSINGTAU, CHINA

One of the most interesting and profitable of the public utilities of Tsingtau is the government slaughterhouse, located on Taiseichin Dori. It is the most fully equipped institution of its kind in the Far East, having been constructed by the Germans at a cost of 850,000 marks, and equipped to slaughter 2,000 head of cattle every twenty-four hours. A great impetus was given to the business by the contract for the supply of beef (fresh frozen) to the American Army in the Philippines. The United States Government has been buying beef for the troops in the Philippine Islands for the past four years.

The United States Government inspectors (veterinarians, U.

S. Army) make postmortem and antemortem inspections for all meat supplied on the United States Government meat contract.

The extent to which the Far East is drawing upon Tsingtau for beef is indicated by the following tables compiled by the Japanese authorities:

	Cattle	Calves	Swine	Sheep	Goats	Total
1915	8,135	214	5,319	276	32	13,976
1916	15,140	107	6,229	405	15	21,896
1917	25,672	55	6,702	400	105	32,934
1918	36,675	35	8,856	764	19	46,349

Destination of Refrigerated Meats

	Japan	Manila	Vladivostok	Dairen	Shanghai	Total
1915	99	.....	3,575	135	.....	3,809
1916	88	4,733	5,266	390	23	10,500
1917	662	11,902	8,241	666	5	21,476
1918	77,656	19,115	3,156	617	.....	30,544

Income of abattoir for fiscal year, beginning April 1, 1915, $37,219; 1916, $70,522; 1917, $112,685.

The expenses of operation are slight, so the income begins to assume importance as a source of revenue for the support of other municipal departments. The business gives every sign of still further expansion, as the cattle are drawn from several adjacent provinces. The practice is for the Shantung drovers to buy young calves in the neighboring provinces of Chihli, Shansi, Shensi and Honan and sell them to the Shantung farmers who fatten them for the Tsingtau beef trade.—(Abstract from *Far Eastern Review,* China.)

Discussion of Article.—The facts in the above article were derived from the records of the Japanese authorities now occupying Tsingtau, and were given to Mr. George Bronson Rea who recently made a tour of the Shantung Peninsula. In some instances, however, they may be a little misleading to one not acquainted with the existing conditions in China. The cattle imported into Shantung are not chiefly for fattening for the beef trade, as one would understand it in the United States, but are brought into Shantung and its vicinity for draft purposes. At the end of the planting and harvesting seasons the older animals are sold off to economize on forage. There is practically no pas-

ture or grazing land in the province as the entire section is intensively cultivated to provide food for the large population. The forage for these animals is chiefly the residue and remainder of that raised for the human branch of the family, potato vines and the roots of the various plants, cut straw, bean and peanut vines, sometimes though rather rarely bean and nut cake. This practice makes it very difficult at times to get suitable cattle for beef purposes, the fat cattle coming to market at two seasons of the year, late spring after sowing and in the late autumn after harvest. They are driven over the road for sometimes sixty or even a hundred miles to the Chinese market for sale to the foreign buyers. Between seasons, owing to the lack of forage, the cattle come into the yards and are offered for inspection in a thin, almost emaciated state. The greatest per cent of the animals are castrated males, that is castrated in the Chinese fashion by crushing or burning, which still leaves an undeveloped testicle and the tendency to ride each other if left to run loose. There is a ruling that females suitable for breeding purposes will not be slaughtered, but as the owner merely needs to make a statement that the animal will no longer breed, they are gradually robbing the country of breeding animals. If this practice continues there will be a scarcity of beef in the future to say nothing of animals for work purposes.

Even now at times it is difficult to get suitable animals for supplying beef required by contract, and there is a noticeable difference in the animals submitted for inspection now and in former years.

The inspection of beef and beef cattle as conducted by the Japanese authorities, although copied from United States Bureau of Animal Industry, and probably the most thorough in the East, is not to be compared with inspection in the United States. They are making good progress along these lines, and taking great interest in the work. In connection with the slaughterhouse at Tsingtau, they have a laboratory for the production of serum, and are also doing research in an attempt to eradicate rinderpest and control the outbreaks of foot-and-mouth disease, which two diseases are causing the greatest losses of cattle among the Chinese. Anthrax and tuberculosis are rarely found, although among pigs cholera is quite prevalent. While the antemortem inspection of the army veterinarians is thorough, the postmortem examination is principally that of a rail inspection,

the inspector being permitted in the killing beds only to inspect for quality and condition and not permitted to inspect glands or organs. The authorities are willing to act on suggestions of the army inspectors and since the contract for beef for the U. S. Army has been in Tsingtau the slaughter-house officials have made a great improvement in their work.

INTERNATIONAL CONGRESS ON COMPARATIVE PATHOLOGY POSTPONED

THE SECOND International Congress on Comparative Pathology, which was to have been held at Rome in April last, has been postponed, because, in the words of a statement issued by the committee on organization, of which Prof. E. Perroncito is the head, "the committee has had to recognize, to its great regret, that even in the field of science we are still far from having reestablished the cordial understanding which alone can assure the cooperation of all scientists interested in comparative pathology, in a manner to render useful and profitable an international congress." The committee expressed its intention to continue its efforts looking to the resumption of international scientific relations "without any exclusion."

This action was evidently taken in view of the attitude of the French committee in refusing to participate in the Congress if Germans were admitted, unless the German scientists publicly repudiated their indorsement of Germany's course in the war.

A communication just received from Prof. Perroncito states that with the concurrence of the French committee the Congress has been set for September 20, 1922. It is hoped that by that time international amity will have been sufficiently restored in the scientific world to make possible a successful and representative Congress.

RINDERPEST IN BRAZIL

Under the date of April 4, Dr. G. A. Roberts, formerly of the Agricultural College of North Carolina, and now head of the Veterinary Institute of Sao Paulo, Brazil, writes that he discovered an outbreak of rinderpest that has been introduced into Brazil for the first time.

On the 5th of March, 1921, Dr. Roberts investigated a serious

epizootic among cattle and from the result of his investigations concluded that the disease was rinderpest (*peste bovina*). Dr. Roberts' work was confirmed by Dr. Smillie, of the Rockefeller Foundation.

Dr. Roberts, on his own initiative, began immediately the preparations of a serum for the immunization of cattle against rinderpest.

Dr. Roberts has promised a paper on this subject for the next A. V. M. A. meeting.

Dr. Thomas Frazier of Richmond is spending several months in Scotland visiting relatives.

Dr. M. J. Hughes has removed from Omaha, Nebr., to Denver, Colo., where he will practice and also represent the Goshen Laboratories in that State.

The many friends and former associates of Dr. William S. Devoe will be glad to learn that he is enjoying a well-earned vacation at his home in Choppaqua, N. Y.

Dr. Braden M. Lyon of Pearl River, N. Y., was a recent visitor to Washington, D. C., where he spent considerable time conferring with the scientists at the various Government laboratories.

Dr. Charles W. Boyd who was in practice at Sewickley, Pa., has lately succeeded Dr. S. E. Young at the Bell Farm, Coraopolis, Pa., Dr. Young having accepted a position with Allegheny County, Pa.

Dr. R. J. Donahue, former chief of the Dairy and Livestock Division of the Washington State Department of Agriculture, has returned to the State service and has been assigned to duty in Eastern Washington. Dr. Donahue left the State employ to accept a position with the Carnation Stock Farm at Tolt, Wash.